

Excel 50/100/500/600/800 CONTROLLERS

HONEYWELL EXCEL 5000 OPEN SYSTEM

SOFTWARE DESCRIPTION

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REVISION OVERVIEW

The following pages have been changed from the previous issue of this document:

page	change
33	Section "SENSOR OFFSET" added

SYSTEM OVERVIEW

- General** Excel 50/500/800 controllers support both LONWORKS communication and the Honeywell proprietary C-Bus communication. All LONWORKS-related information is described in the LONWORKS Mechanism document (EN0B-0270GE51).
- Excel 50/100/500/600/800 is a control and monitoring system specially designed for use in buildings. These Excel controllers use the latest Direct Digital Control (DDC) technology. Excel 50/500/800 controllers are also capable of communicating on an open Echelon® LONWORKS® network. Excel 50/100/500/600/800 controllers are particularly well-suited to controlling buildings such as schools, hotels, offices, and hospitals. Excel 50/100 controllers differ from Excel 500/600/800 controllers in having a fixed input/output configuration. Excel 50 controllers have a smaller fixed input/output configuration, and are designed for smaller buildings such as restaurants, shops, banks, and offices.
- Excel 50/100/500/600/800 functions are:
- Heating control
 - Air conditioning control
 - Energy management
 - Energy optimization
 - Other building management functionality
- Software** The Excel 50/100/500/600/800 system includes a comprehensive software package specially designed to meet the requirements of application engineers. It comprises the following:
- Datapoint description
 - Time program
 - Alarm handling
 - Password protection
- The software package comes with all the files listed. The menu-driven format allows quick and easy operation.
- Firmware version number** All information appearing in this Software Description is valid for firmware versions V1.3.xx and earlier. All information, functions, and attributes valid for newer firmware versions (V1.5.xx or higher) are marked by the corresponding version number for which they are valid. Fig. 1 shows various controllers and the firmware version numbers that they support.

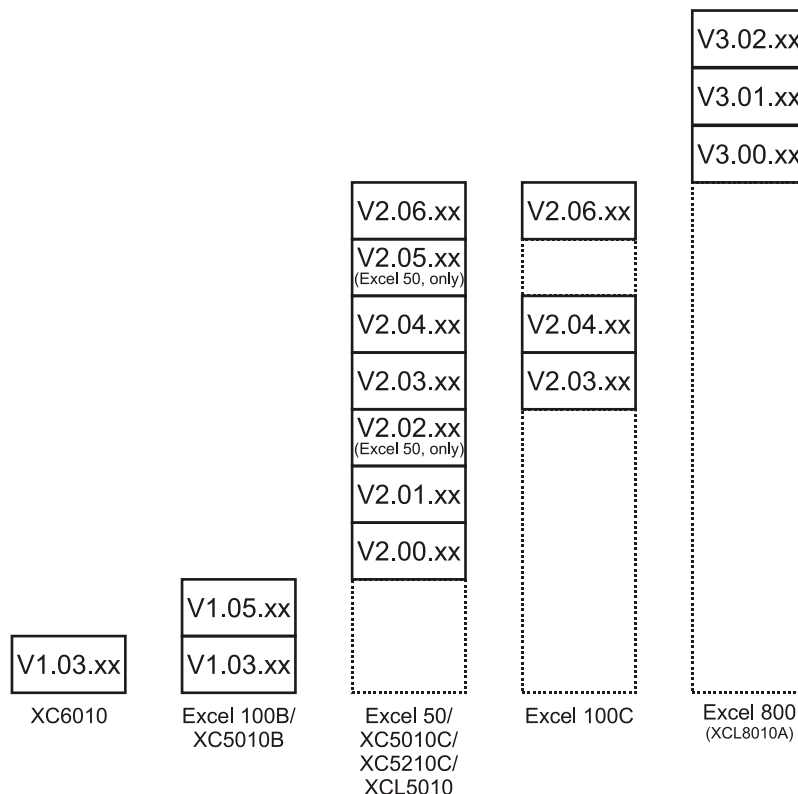


Fig. 1. Controllers and their supported firmware versions

Excel 50 firmware compatibility

Please always make sure that your firmware and the bootstrap loader match; if in doubt, consult Software Release Bulletin(s). Special care must be taken in particular in the case of the combinations of firmware and bootstrap loader with XD50B-xxx modules as set forth in **Error! Reference source not found.**

Table 1. Firmware / bootstrap loader compatibility with XD50B-xxx modules

	firmware ≤ 2.06.07	firmware ≥ 2.06.08
bootstrap loader ≤ 1.01.07	NO*	OK
bootstrap loader ≥ 1.01.08	OK	OK
*Problems may occur when LONWORKS bus is in use.		

Table 2. Firmware / bootstrap loader compatibility with XD50-xxx modules

	firmware ≤ 2.06.07	firmware ≥ 2.06.08
bootstrap loader ≤ 1.01.07	OK	OK
bootstrap loader ≥ 1.01.08	OK	OK
*Problems may occur when LONWORKS bus is in use.		

Datapoint description

Datapoints are the basis of the Excel 50/100/500/600/800 system. Datapoints contain system-specific information such as values, status, limit values, and default settings. The user has easy access to datapoints and the information they contain. The user can recall and modify information in the datapoints.

Time programs

Whenever you want, you can use time programs to enter the setpoint or status for any datapoint. The following time programs are available:

- Daily programs
- Weekly programs

- Annual programs
- The "TODAY" function
- Special day list

Daily programs are used to create a weekly program. The annual program is created automatically by multiplying the weekly program and then incorporating additional daily programs. The "TODAY" function enables you to have a direct influence on the switching program. This function enables you to allocate a setpoint or status to the selected datapoints for a defined time period. This action does not depend on the current daily program.

Alarm handling

The alarm handling facility offers system security. Alarm signals can, for example, alert the operator to maintenance work that is due. All alarms that occur are stored in data files and reported immediately. If your system configuration allows, you can also list alarms on a printer or transmit alarms to higher-level front-ends. There are two kinds of alarm: Critical and Non-critical. Critical alarms have priority over non-critical alarms. System alarms, caused by a fault in a controller, are always critical alarms.

To distinguish between alarm types, you can generate your own alarm messages or select appropriate messages already in the system.

The following events all generate alarm messages:

- Exceeding limit values
- Overdue maintenance work
- Totalizer readings
- Digital datapoint changes of state

Application program

You can use the Honeywell CARE engineering tool to create application programs for your system. A particular advantage offered by Honeywell CARE is the ability to create a fully functional control program without having to be familiar with the programming language. CARE stands for Computer Aided Regulation Engineering.

Passwords

Your control system is also protected by passwords. This ensures that only authorized persons have access to the system data. There are four operator levels, each protected by its own password.

- Operator level 1: Read only; the operator can display information about setpoints, switching points, and operating hours.
- Operator level 2: Read and make limited changes; the operator can display system information and modify certain preset values.
- Operator level 3: Read and make changes; system information can be displayed and modified.
- Operator level 4: Programming.

Password protection prevents unauthorized access system information and ensures permanent, secure system operation.

DATAPPOINTS

An Excel 50/100/500/600/800 system can have the following number of datapoints:

- Excel 50: 22 physical (onboard I/Os) plus up to 46 physical LON I/Os
- Excel 100: 36 physical (onboard I/Os)
- Excel 500: 128 physical I/Os, extendable via LONWORKS I/Os
- Excel 600: 128 physical I/Os

Furthermore, Excel 50/100/500/600 support an additional 256 pseudo datapoints.

Excel 800: 381 datapoints (random mix of physical and pseudo datapoints)

A datapoint has different attributes according to its type. Attributes are displayed and modified on the XI581 (not with XCL5010, Excel 100C), XI582, and the PC-based XL-Online operator interfaces or on the Excel 50 MMI. Attributes contain information about the given datapoint. This information could be:

- Input limits values
- Operating status
- Current temperature
- Elapsed run time

The following sections provide more-detailed information about the different kinds of datapoints and datapoint attributes and explain which attributes are assigned to which datapoints.

Physical Datapoints

Physical datapoints are inputs and outputs attached to hardware devices like sensors and actuators.

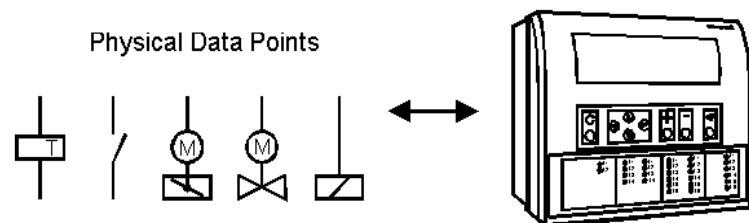


Fig. 2. Physical datapoint symbols

The following are examples of physical datapoints

Analog inputs	NTC, PT 1000, PT 3000, BALCO Sensors (PT 3000/BALCO not with Excel 100C), standard 0 (2)...10 V and 0 (4)...20 mA input, to connect e.g. outside air temperature sensors.
Analog outputs	Outputs with a continuous 0...10 V output signal for controlling continuous actuators (Excel 100C supplies up to 20 mA on the analog outputs).
Digital inputs	Inputs for processing voltage-free signals (switches, contacts).
Digital outputs (not Excel 100C)	Outputs for driving three-position actuators, for <u>example</u> , a damper motor; two position devices, for <u>example</u> , a circulation pump; 0...10 V and pulsed outputs
Totalizer inputs	Digital inputs for processing pulsed signals up to 20 Hz (depending on Distributed I/O module specifications), for <u>example</u> , metered energy consumption.

Flexible Datapoints

Flexible datapoints allow the control of more than one physical output with one datapoint. There are three subordinate types of flexible datapoints:

- Pulse 2
- Multi-stage
- Feedback.

Pulse 2 flexible datapoint

A pulse 2 datapoint allows to pulse two digital outputs (e.g. relays). When activated (e.g. set to "on"), Pulse 2 triggers one of the digital outputs, and when deactivated, Pulse 2 triggers the other digital output.

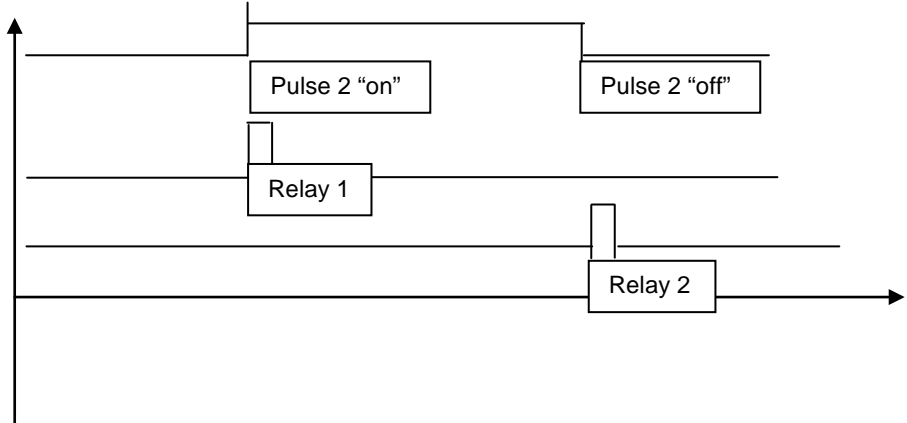


Fig. 3. Pulse 2 flexible datapoint switching

Multistage flexible datapoint

Multistage flexible datapoints allow to switch up to six physical digital outputs via one datapoint. A typical example would be a multi-stage electric heater or a multi-stage fan. A multistage flexible datapoint provides up to six editable stage texts, e.g., stage 1, stage 2, stage 3, etc., to be edited in CARE.

Feedback flexible datapoint

Feedback flexible datapoints, also called "DO feedback DI" combine up to three pairs of digital outputs/digital inputs to form up to three-stage switching with feedback. The digital inputs of each pair act as the feedback point. If the digital input does not feedback the actual equipment status within a predefined time "Off Phase", then the software will switch down this point type until a "non-alarm" state is reached. In extreme cases, the point may be switched to the off position. See also "Off Phase".

Increased support (V2.04.xx or higher)

Excel 500 controllers now support up to 60 flexible datapoints. In case of Feedback flexible points, the maximum number is 128.

Previous firmware versions supported only up to 20 flexible datapoints.

Pseudo Datapoints

Excel 50/100/500/600 support 256 pseudo datapoints, while Excel 800 supports 381 datapoints (consisting of a random mix of physical and pseudo datapoints) Pseudo datapoints are values (intermediate results and parameters) computed while the application program is running. In contrast to physical datapoints, pseudo datapoints are not directly connected to hardware devices.

Access via the user address

During system operation, you may need to access these values. To simplify this process, you can include pseudo datapoints in the datapoint list, where you can access them directly via their user addresses. Like physical datapoints, pseudo datapoints, too, can have different attributes; for example, they can specify a manual value, set minimum and maximum values, or log trends.

The following are types of pseudo datapoints:

- Pseudo analog points
- Pseudo digital points
- Pseudo totalizer inputs
- Pseudo point multistage

Pseudo analog points Pseudo analog points are software points containing an analog value in the user program. A pseudo analog point could, for example, contain a flow temperature setpoint calculated from the room setpoint and the outside air temperature via the heating curve.

Pseudo digital points Pseudo digital points are software points containing a digital value in the user program.

For example, logical AND operation.

The AND operation provides a logical 1 output when all input conditions are also logical 1. Otherwise the output is a logical 0. If the user program contains such an AND operation on different input conditions, then the output could be available as a pseudo digital datapoint.

Pseudo totalizer inputs Pseudo totalizer inputs are digital software points from the user program, where a totalizer counter input is recorded

Pseudo point multistage Pseudo point multistage datapoints are identical to flexible datapoint of the type "multistage" except that they allow for 16 stages (including the "off stage") and the attribute "Status Text" allows for 16 status texts to be attached. The attribute "Technical Address" is not required.

Global Datapoints

If your control and monitoring system contains more than one controller, the controllers communicate with one another via the system bus. Any given controller can thus both receive (read) datapoints from other controllers and transmit datapoints to other controllers. Such datapoints are referred to as **global datapoints**.

NOTE: The term "global" as used here encompasses more than just those points explicitly labeled as "global" in the CARE engineering tool.

Global datapoints which a controller receives (reads) from other controllers are referred to as **local** global datapoints, and global datapoints which a controller transmits to other controllers are referred to as **remote** global datapoints. During CARE engineering, the program engineer must take care that he does not exceed the maximum allowed 256 global datapoints (remote and local) per controller.

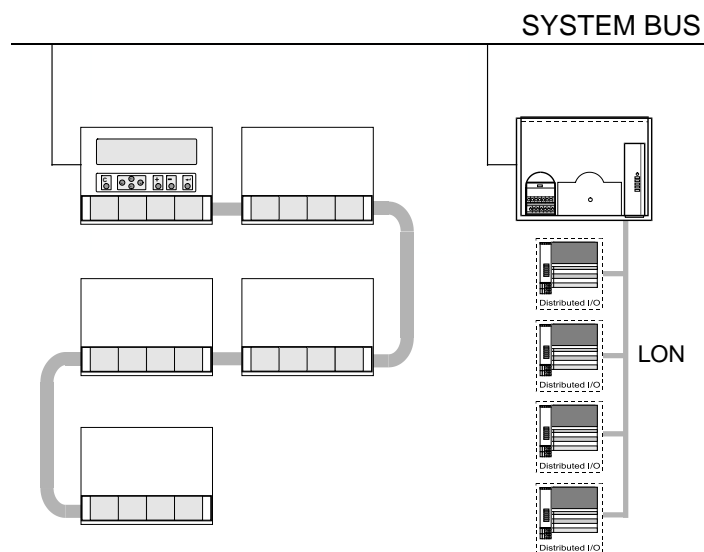


Fig. 4. Global datapoints are available to all controllers on the system bus

Mapped Datapoints (V2.04.xx or higher)

With firmware version V2.04.xx or higher, those Excel 50/500 controllers which feature free programmability on LONWORKS (those that contain the 3120E5 Neuron chip, i.e. date code 0044 or higher) may have I/O devices connected via the LONWORKS network. LONWORKS network variables (or individual fields of structured network variables) can be mapped to the attribute "Value" of physical datapoints (AI/DI/AO/DO). Pseudo analog, pseudo digital, and pseudo multistage points are also supported for NV mapping.

See Excel 50/500 LONWORKS Mechanisms Interface Description, EN0B-0270GE51, for more information on LONWORKS network variables and datapoint mapping.

ATTRIBUTES

Each datapoint type has associated with it various parameters which allow the user to set, e.g., the user address, the level of access protection, alarm behavior, and other options. These parameters are called attributes. Each attribute performs a specific function related to the datapoint. A complete list of datapoint types and their attributes appears in Table 17 through Table 19. Not all attributes are available for every datapoint type.

Point refreshing (V1.5.x)

Four attributes ("Value", "Manual Value", "Operating Mode", and "Alarm Status") will be simultaneously refreshed to an XL-Online operator interface.

NOTE: A complete list of attributes associated with the various datapoint types can be found in the section "List of Datapoint Attributes" on page 38.

Access Level

Four levels of protection

The attribute "Access Level" protects datapoints against unauthorized changes on the basis of the password level needed to modify a datapoint. "Access Level" attributes between "1" and "4" are assigned to a point. These attributes correspond to the four password levels found in the XI581 (not with XCL5010, Excel 100C), XI582, and XL-Online operator interfaces and the Excel 50 MMI:

- Operator level 1: Read only.
- Operator level 2: Read and make limited changes.
- Operator level 3: Read and make changes.
- Operator level 4: Programming.

For example, setting the "Access Level" attribute for the datapoint with the user address "room temp floor 1" to "2" means that all attributes for this datapoint can now only be edited or modified at password level 2 or higher.

Acknowledge Alarm (V2.04.xx or higher)

The attribute "Acknowledge Alarm" allows a controller to acknowledge an alarm for a flexible datapoint of the type "feedback" without changing the operating mode. The controller takes the point out of alarm as soon as a rising edge is detected on the input of the WIA statement writing to the attribute "Acknowledge Alarm".

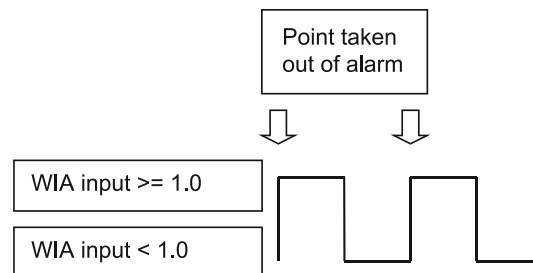


Fig. 5. The "Acknowledge Alarm" attribute for WIA statement

This attribute is a virtual attribute and can be accessed only by a WIA statement in CARE. It is not part of the datapoint description and therefore cannot be displayed on an MMI or building supervisor.

Active State (prior to V2.04.x)

The attribute "Active State" defines when a digital input/output is active.

NOTE: The "Active State" attribute does **not** reflect the current condition of a digital datapoint.

NOTE: This is not applicable to digital inputs in applications designed for controllers using V2.04.xx firmware or higher. In such applications, this attribute is fixed at 1, and the new attribute "Normally Open/Normally Closed" (NO/NC) is active (see section "Normally Open/Normally Closed (V2.04.xx or higher)" on page 28 for more details).

The following values are possible:

- 0 = digital input/output is active when a "logical 0 signal" is present
- 1 = digital input/output is active when a "logical 1 signal" is present

Table 3 indicates the active state for various conditions of the XF523 and XFL523 modules.

Table 3. Active state for the digital input of XF523 and XFL523 modules

contact status	digital input							
	open				closed			
CARE definition (NC/NO system diagram)	NC		NO		NC		NO	
definition - in XL-Online DP-Editor attribute "Active State" (change Active/Passive State text)	1	0	1	0	1	0	1	0
CARE interpretation (control table)	1	1	0	0	0	0	1	1
display at operator interface (status text)	OFF/ trouble: alarm	ON/ operating RTN*	OFF/ trouble: alarm	ON/ operating RTN*	ON/ operating RTN*	OFF/ trouble: alarm	ON/ operating RTN*	OFF/ trouble: alarm

* RTN = Return To Normal

NOTE: XFL523 Module is applicable only for V2.0.xx software.

Active State (Excel 800)

The attribute "Active State" defines when a digital input/output is active. 1 means, that a digital input/output is active when a "logical 1 signal" is present

NOTE: "Active State" = 0 is not allowed/possible.

NOTE: The "Active State" attribute does **not** reflect the current condition of a digital datapoint.

Table 4. Active State for the digital input of XF823 and XFL823 modules

contact status	digital input							
	open				closed			
CARE definition (NC/NO system diagram)	NC		NO		NC		NO	
definition - in XL-Online DP-Editor attribute "Active State" (change Active/Passive State text)	1		1		1		1	

	digital input							
CARE interpretation (control table)	1		0		0		1	
display at operator interface (status text)	OFF/ trouble: alarm		OFF/ trouble: alarm		ON/ operating RTN*		ON/ operating RTN*	

* RTN = Return To Normal

Alarm Delay

Delaying alarm outputs

The alarm delay time (in seconds) is entered in the attribute "Alarm Delay". The alarm delay time determines how long an alarm condition must exist before an alarm is generated. Entering an alarm delay time of 10 seconds means that the limit value must be exceeded for at least 10 seconds before this datapoint generates an alarm. If the limit value lasts for only 7 second, then no alarm occurs.

Alarm Suppression

The attribute "Suppress Alarm" establishes whether or not alarm messages from the following alarm attributes should be suppressed:

- Operational status
- Min/Max. limit
- Maintenance alarm
- Interval counter
- Alarm Status

The following entries are possible:

- Off Alarms not suppressed
- On Alarms suppressed

Digital input example

In addition to a variety of other attributes, a digital input also has the "Operating Mode", "Alarm Status", and "Maintenance Alarm" attributes. If alarm suppression is activated for this datapoint, then no message is displayed during an operating mode change-over, or when changing into the alarm condition, or when reaching the maintenance alarm.

Suppression of system alarms (V2.04.xx or higher)

The controller will not issue a system alarm when the alarm's system alarm text starts with an @ character.

Alarm Status (prior to V2.04.x)

Alarm monitoring

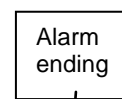
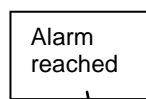
In the case of a digital input or a pseudo digital point, the attribute "Alarm Status" specifies whether or not alarm monitoring is required.

The following entries are possible:

- Yes: Alarm monitoring is required
- No: Alarm monitoring is not required

When alarm monitoring is required, the alarm message occurs when the digital point changes from the active state to the passive state (alarm reached). An additional message is generated (alarm going) when the digital point returns to the active state

(see Fig. 6. Alarm status messaging)



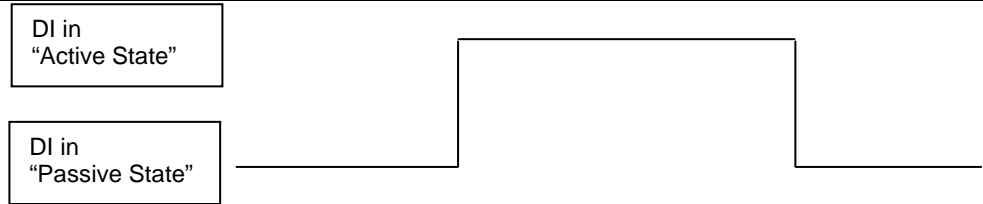


Fig. 6. Alarm status messaging

NOTE: The active state and passive state are defined in the "Active State" datapoint attribute.

Alarm Status (V2.04.xx or higher)

Alarm monitoring

In the case of a digital input or a pseudo digital point, the attribute "Alarm Status" specifies whether or not alarm monitoring is required. The following entries are possible:

- Yes: Alarm monitoring is required
- No: Alarm monitoring is not required

When alarm monitoring is required, the alarm message occurs depending on the physical contact status and on the logical status as defined in the online attribute "Normally Open/Normally Closed".

Alarm Type

The attributes listed in Table 5 are capable not only of generating alarms, but also of writing them to the internal alarm memory and sending them to the PC front-end or to the modem module (when connected).

Table 5. Alarm attributes

attribute	always critical	optional critical or non-critical
Operating Mode	X	
Min. Limit		X
Max. Limit		X
Maintenance Alarm		X
Interval Counter		X
Alarm Status		X

Changing over the attribute "Operating Mode" always results in a critical alarm, but the attribute "Alarm Type" offers a choice for the alarm attributes "Min. Limit", "Max. Limit", "Maintenance Alarm", "Totalizer", and "Alarm Status" whether an alarm is classified as critical or non-critical. Distinguishing between critical and non-critical alarms is significant for the subsequent reporting of the alarms to the PC front-end or to the modem module. Compared to non-critical alarms, critical alarms are given priority on the bus when several alarms are in the alarm queue. When the type of alarm for a datapoint has been decided, e.g. "critical" alarm type, it refers to all alarm attributes for this datapoint.

Alarm Definition

In the datapoint description, the alarms can be influenced using the functions described below (see also Table 6 on page 17).

- Alarm type** For each datapoint in the datapoint description, the user can determine whether the signals generated are to be treated as critical or non-critical alarm.
- Alarm delay** An alarm signal can be delayed by entering an alarm delay time. An alarm signal will be generated only if an alarm continues uninterrupted during the alarm delay time.
- Suppress alarm** If an alarm signal is not desired from a particular datapoint, this can be fixed in the datapoint description. Thus, all the alarm signals relevant to the particular datapoint and the "Operating Mode" alarm types are suppressed.

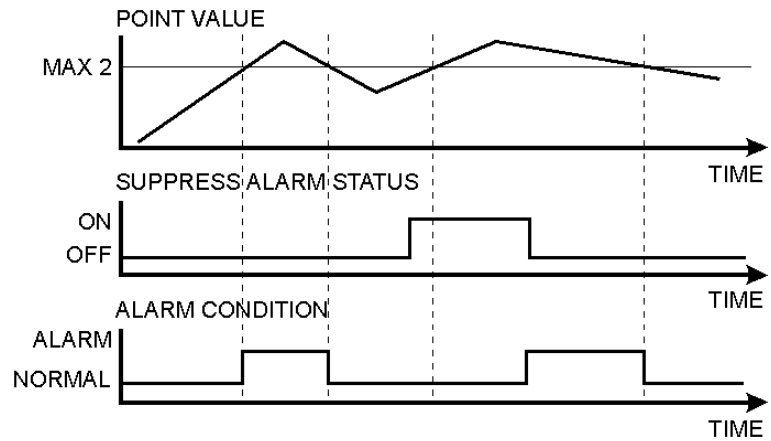


Fig. 7. Alarm condition depending on point value and Suppress Alarm status

Fig. 7 shows an example of a changing point value that rises above and falls below the limit Max 2. If Suppress Alarm is not active, then the alarm condition switches between normal to alarm, according to the limit Max 2. If Suppress Alarm is active, then the alarm condition remains normal unless Suppress Alarm is switched off before the point value falls below the limit Max 2. Regardless of the setting of the Alarm suppression flag, an alarm is entered into the controller's history buffer and is also available in the EBI alarm report.

- Point alarm** It is possible to view all datapoints at the operator interfaces for which the limit value (analog point) or the alarm status (digital point) is currently exceeded. Driven by a menu, the user address and the accompanying alarm text are displayed on the XI581 (not with XCL5010, Excel 100C) or XI582 operator interfaces or Excel 50 MMI. On the XL-Online operator interface, a datapoint within the framework of the datapoint description can be seen in all four password levels. If a current alarm is present for the point in question, the attribute "Point in Alarm" produces the display "Yes", otherwise "No". Within the framework of the datapoint description, it is possible, under the attribute "Alarm text", to enter an alarm text of up to 18 characters in addition to the preprogrammed text. There are 256 alarm texts in total. Table 6 presents a summary of various alarm types and attributes.

Table 6. Alarm summary

alarm type/attributes	alarm status	enter alarm delay time	alarm suppression	point in alarm	no. of preprogrammed texts	supplementary text
Limit Values	selection in DPD*	possible	possible	X	8	possible
Alarm Status	selection in DPD*	possible	possible	X	2	possible
Maintenance Alarm	selection in DPD*	-	possible	-	1	-
Totalizer	selection in DPD*	-	possible	-	1	-
Operating Mode	always critical	-	possible	-	2	-
System Alarms	always critical	-	-	-	approx. 110	-

alarm type/attributes	alarm status	enter alarm delay time	alarm suppression	point in alarm	no. of preprogrammed texts	supplementary text
user program reports	always non-critical	-	-	-	-	-
*DPD = datapoint description						

NOTE: A point is still seen as "in alarm" even when alarm suppression is enabled.

Cycle Count

The attribute "Cycle Count" contains the value indicating the number of transitions to the active state (see "Active State (prior to V2.04.x)" on page 14).

Delay Time Switching Up

This attribute is used in conjunction with flexible points of the type "feedback". It defines the delay time between switching upwards from one stage to another. The delay time affects every stage. The delay time also takes effect when switching, e.g. from manual value 0 to 2. In this case, it is switched from stage 0 to stage 1, then to stage 2 with the delay time between the switching processes.

Range: 0 to 255s
 Default value: 10s
 Resolution: 1s

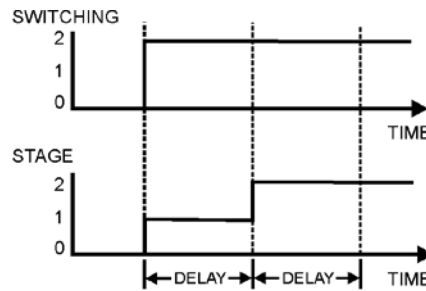


Fig. 8. Delay time switching up

Delay Time Switching Down

This attribute is used in conjunction with flexible points of the type "feedback". It defines the delay time between switching downwards from one stage to another. The delay time affects every stage.

Range: 0 to 255s
 Default value: 10s
 Resolution: 1s

The feedback delay time starts to count after termination of delay time switching up/delay time switching down.

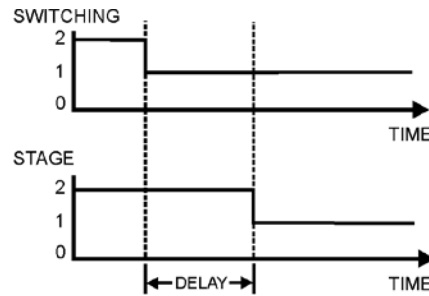


Fig. 9. Delay time switching down

Descriptors

Informative descriptors

A controller contains up to 128 physical datapoints and up to 256 pseudo datapoints. The Excel 100C provides 36 physical datapoints. An individual user address can be assigned to each of these 384 datapoints. 255 plain-language descriptors can be created with a maximum of 32 characters each. These descriptors are then assigned to datapoints in the datapoint description via the attribute "Descriptor". Descriptors complete the information concealed behind the user address. They can contain, for instance, a reference to a section of a building. The following list is an example of the relationship between user addresses and descriptors:

User Address

Room temp floor 1
Room temp floor 3
Room temp floor 10
Room temp corridor
Flow temp floor 1
Lights floor 1
Lights corridor

Descriptor

Heating circuit, West wing
Heating circuit, West wing
Heating circuit, East
Heating circuit, East
Heating circuit, West wing
Building section V
Building section V

Engineering Unit

The attribute "Engineering Unit" contains a list for selecting different engineering units for both analog datapoints (physical and pseudo), totalizer inputs (physical and pseudo), and digital datapoints.

If, for instance, the external temperature is measured by an analog datapoint, the engineering unit of this datapoint must be set to "°C" or "°F". If the electrical load is detected by a totalizer input, the engineering unit must be set to "kWh" for kilowatt-hours.

Feedback Delay

The attribute "Feedback Delay" determines the time delay between, e.g. when a pump switched on (and detected) and when this status is made available to a program.

High/Low Alarm/Warning Limits

Specifying limit values

In the case of analog inputs (e.g. inputs for sensing room temperature) and pseudo analog points (for instance, internally computed datapoints for the heating flow setpoint), two minimum and two maximum monitored limit values may be entered.

The following four limit value attributes exist:

- Low Warning Limit
- Low Alarm Limit
- High Warning Limit
- High Alarm Limit

Exceeding the limit values generates an alarm.

Example: Monitoring supply air temperature limits (see Fig. 10).

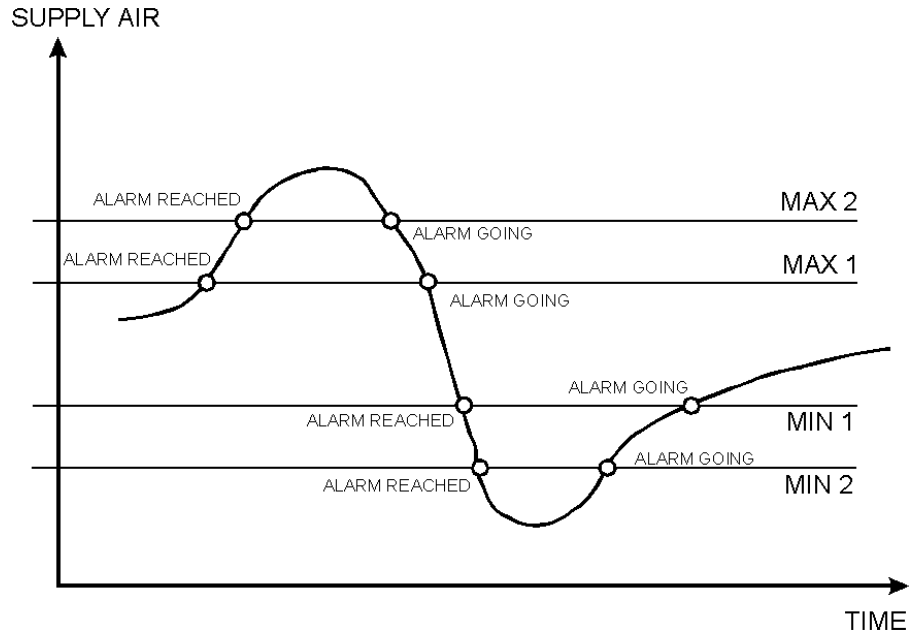


Fig. 10. Monitoring supply air temperature limits

Hours Run

Display of elapsed hours

The attribute "Hours Run" returns the total number of hours during which any of the stages is in the ON position. However, if more than one stage is in the ON position, the "Hours Run" count is not added up, but rather counted only once. Display of the elapsed hours run with activated hours run logging (see also "Hours Run Log" on page 20).

NOTE: If the attribute "Active State" of the point is 0, then the OFF position is also counted.

Hours Run Log

Hours run log

An hours run log can be carried out for digital datapoints (physical and pseudo) and for flexible datapoints, e.g. logging the hours run by a heating circuit pump. This requires the decision: hours run log = Yes/No to be made in the attribute "Hours Run Log". The accumulated hours run are displayed in the attribute "Hours Run". Hours run are logged with a sample rate of 1 minute.

Hours Since Serviced

Display hours run since last maintenance

The elapsed hours run since the last maintenance work are totaled in the attribute "Last Maintained". If, for example, the maintenance alarm is 500 hours, and a pump has already been running for 120 hours, then the entry in the attribute "Last

maintained" will be 120 hours. By comparing the attributes "Maintenance Alarm" and "Last Maintained", the user can see that the next maintenance period will be after an additional 380 hours have elapsed. If the maintenance alarm is reached, and the maintenance work has been performed, the counter can be reset manually. The counter can also be reset manually before reaching the maintenance alarm if, for instance, the maintenance has been performed earlier. If the counter is not reset, on expiration of the maintenance alarm, e.g. after 500 hours, the elapsed hours run continues to be incremented, and an additional alarm will be generated when 1000 hours running has been reached.

Hysteresis

The following hysteresis attributes allow the user to control the triggering conditions based on a changing parameter under which actions are taken, such as alarm signaling, writing values to buffers, etc. A hysteresis can be used, e.g., to prevent an alarm from being generated unless the value being monitored changes by more than a given value. This eliminates unnecessary alarm generation and reduces bus communication traffic.

Alarm Hysteresis

Alarm hysteresis (V1.5.x)

In the case of analog inputs and pseudo analog points, the attribute "Alarm Hysteresis" is available. It provides variable hysteresis that can be implemented, e.g., in order to reduce the cost of communicating with a remote front-end. The hysteresis value is set from an MMI and can have a value anywhere in the range defined by $[10^{-a} \text{ to } (\text{Max1} - \text{Min1})]$ where "a" is the number of decimal places set in the attribute "Engineering Unit". The minimum value for the hysteresis is 10^{-a} . Alarms are generated under the following conditions:

- Max 1 Alarm (generated if MAX 1 is exceeded)
- Max 2 Alarm (generated if MAX 2 is exceeded)
- Max 2 Normal (generated if the value falls below MAX 2-Hysteresis)
- Max 1 Normal (generated if the value falls below MAX 1-Hysteresis)
- Min 1 Alarm (generated if the value falls below MIN 1)
- Min 2 Alarm (generated if the value falls below MIN 2)
- Min 2 Normal (generated if the value MIN 2+Hysteresis is exceeded)
- Min 1 Normal (generated if the value MIN 1+Hysteresis is exceeded)

The CARE default value (i.e. 1% of actual value and no less than 0.2) for this attribute is 0. Access to "Alarm Hysteresis" is also possible via RIA/WIA.

NOTE: The number of decimal places can be changed only using CARE.

NOTE: Attempting to enter a hysteresis value that is less than the allowed minimum will result in the attribute being assigned the minimum value as defined above.

Example:

In this example, the number of decimal places in the attribute "Engineering Unit" has been chosen to have a value of 2. Fig. 11 shows an example datapoint value as a function of time that increases and decreases over the range from Max 1 to Min 1.

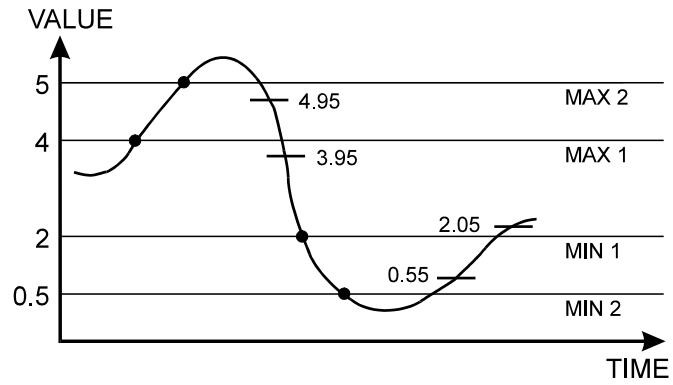


Fig. 11. Example of alarm hysteresis

The "normal" and "alarm" states as defined by the attribute "Alarm Hysteresis" are determined using the appropriate values in the formula given above:

$$\text{Range} = [10^{-2} \text{ to } (\text{Max1} - \text{Min1})] = [0.01 \text{ to } 2]$$

Table 7 lists the resulting alarm conditions for the chosen hysteresis value of 0.05:

Table 7. Alarm conditions for alarm hysteresis

limit	normal to alarm condition	alarm to normal condition
Max 1	4.00	4.00 - 0.05 = 3.95
Max 2	5.00	5.00 - 0.05 = 4.95
Min 1	2.00	2.00 + 0.05 = 2.05
Min 2	0.5	0.5 + 0.05 = 0.55

Trend Hysteresis

Trend hysteresis (V1.5.x)

The attribute "Trend Hysteresis" is available for the trend functions "Local Trend Data" and "Trend Setup Data". The attribute "Trend Hysteresis" prevents new values from being written to the trend buffer unless the datapoint value changes (positively or negatively) at more than the specified trend hysteresis. The minimum hysteresis value is 10^{-a} (a = number of decimal places set in the attribute "Engineering Unit"). The CARE default value (i.e. 1% of actual value and no less than 0.2) for this attribute is 0. Access to "Trend Hysteresis" is also possible via RIA/WIA.

This value can be edited from an operator interface (XI581 (not with XCL5010, Excel 100C), XI582, XL-Online, or Excel 50 MMI) via the B port (XC5010C/XC6010) or the serial port, the system bus (XBS 1.3.3 and higher and XFI 1.6.1 and higher) and CARE RIA/WIA statements. The password level for this attribute is determined by the attribute "Access" (default initialization value in CARE is 0).

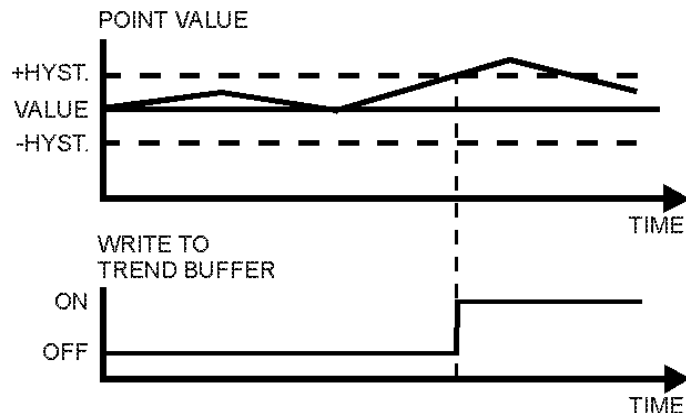


Fig. 12. Example of the attribute "Trend Hysteresis"

Broadcast Hysteresis

Broadcast hysteresis (V1.5.x)

The attribute "Broadcast Hysteresis" is available for the datapoint type "Global Analog". The attribute "Broadcast Hysteresis" prevents new values from being broadcast to other controllers unless the datapoint value changes (positively or negatively) at least by the amount specified in the attribute "Broadcast Hysteresis". The minimum hysteresis value is 10^{-a} (a = number of decimal places set in the attribute "Engineering Unit"), but not smaller than 0.2 (see also the [example](#) in section "Value Hysteresis" on page 35). The CARE default value (i.e. 1% of actual value and no less than 0.2) for this attribute is 0. Access to the attribute "Alarm Hysteresis" is also possible via RIA/WIA. This value can be edited from an operator interface (XI581 [not with XCL5010, Excel 100C], XI582, XL-Online, and Excel 50 MMI) via the B port (XC5010C / XC6010) or the serial port (Excel 100C, Excel 500), the system bus (XBS 1.3.3 and higher and XFI 1.6.1 and higher), and CARE RIA/WIA statements. The password level for this attribute is determined by the "Access" attribute (default initialization value in CARE is 0). If several global points (remote points) are assigned to the same physical point, the lowest global point "Broadcast Hysteresis" value of all assigned global points is used.

Intrinsic Hysteresis for Analog Input Signals

A minimum default hysteresis of 37 mV (24 - 1 bit) for 0 to 10 V input signals is implemented. Due to the nonlinearity of NTC sensors, the hysteresis varies over the temperature range, whereas it is approximately constant for PT 100/1000/3000 and Balco 500 sensors. Approximations of hysteresis depending on the sensor and temperature range are summarized below.

NOTE The Intrinsic Hysteresis for analog input signals is **not** a user-programmable attribute, but rather an intrinsic hysteresis of the Excel 50/100/500/600/800.

NTC 20k Ω

Hysteresis varies nonlinearly over the entire temperature range and depending on whether the upper boundary (MAX LIMIT) or the lower boundary (MIN LIMIT) is exceeded. The approximations shown in Table 8 can be used in practice (intermediate values can be interpolated):

Table 8. Intrinsic hysteresis values for various temperature ranges

temperature range	average hysteresis MIN LIMIT	average hysteresis MAX LIMIT
-40 °C (-40 °F)	2.2 K (4.0 °F)	2.5 K (4.5 °F)
-30 °C (-22 °F)	1.3 K (2.3 °F)	1.3 K (2.3 °F)
0 °C (32 °F)	0.4 K (0.7 °F)	0.4 K (0.7 °F)
40 °C(104 °F)	0.5 K (0.9 °F)	0.4 K (0.7 °F)
80 °C (40 °F)	1.5 K (2.7 °F)	1.5 K (2.7 °F)
100 °C (212 °F)	3.0 K (5.4 °F)	2.7 K (4.9 °F)
130 °C (266 °F)	8.5 K (15.3 °F)	7.2 K (13.0 °F)

PT 100 (not with Excel 100C)

Hysteresis increases approx. linearly with temperature.
 Average hysteresis: 0.75 K (1.35 °F)
 Hyst. At -45 °C (-49 °F): 0.7 K (1.3 °F)
 Hyst. At 145 °C (293 °F): 0.8 K (1.4 °F)

PT 1000/1

Hysteresis increases approx. linearly with temperature.
 Average hysteresis: 0.8 K (1.4 °F)
 Hyst. At -45 °C (-49 °F): 0.7 K (1.3 °F)
 Hyst. At 145 °C (293 °F): 0.9 K (1.6 °F)

PT 1000/2	Hysteresis increases approx. linearly with temperature. Average hysteresis: 1.6 K (2.9 °F) Hyst. At 0 °C (32 °F): 1.3 K (2.3 °F) Hyst. At 400 °C (752 °F): 2.0 K (3.6 °F)
PT 3000 (not with Excel 100C)	Hysteresis increases approx. linearly with temperature. Average hysteresis: 0.8 K (1.4 °F) Hyst. At -45 °C (-49 °F): 0.7 K (1.3 °F) Hyst. At 145 °C (293 °F): 1.0 K (1.8 °F)
Balco 500 (not with Excel 100C)	Hysteresis decreases approx. linearly with temperature. Average hysteresis: 0.9 K (1.6 °F) Hyst. At -50 °C (-49 °F): 1.0 K (1.8 °F) Hyst. At 150 °C (293 °F): 0.7 K (1.3 °F)

Input/Output Status Text (prior to V2.04.xx)

2 status texts per digital data output

Two status texts can be assigned to each digital datapoint status. Status texts give an overview of the condition of the sensor or switching device connected to the datapoint.

The associated status text appears in the attribute "Value" depending on the actual point status.

For instance, the status texts could be as follows for a point connected to a digital output:

Digital point status 0:	Status Text:	"Passive"
Digital point status 1:	Status Text:	"Active"

Table 9. Relationships between I/O Status, Active State, and Status Text

Input/Output Status	Active State (prior to V.2.04.x)	Status Text
0	0	active
0	1	passive
1	0	passive
1	1	active

Status Text with flexible datapoints

The attribute "Status Text" allows you to describe the value sent to the controller by the digital output Pulse 1 and by flexible datapoints. In the case of flexible datapoints of the type "feedback", the status text refers to the value of the feedback flexible datapoint and not to the required value.

Input/Output Status Text (V2.04.xx or higher)

With firmware 2.04.xx or higher, the relationship between physical output status and logical output status as defined by the attribute "Normally Open/Normally Closed" determines the display of the equivalent status text. See section "Normally Open/Normally Closed (V2.04.xx or higher)" on page 28 for details.

Interval Count

Interval count

The attribute "Interval Count" shows the totalizer value (pulse x scaling factor) accumulated since the last reset.

Displaying the interval count

The attribute "Interval Count" can be viewed on the XI581, XI582, and Excel 50 MMI operating units as well as via the XL-Online Operating Software and building Supervisor front-ends like XBS, EBI and XFI. Based on mathematical rounding, it is

possible that not every value is displayed when high frequency values with high scaling factors are received.

Resetting the interval count

Resetting takes place either manually via an operating unit, by reaching the "Interval Limit" value, or by reaching the "totalized" constant, which is 2 to the power of 31.

Totalizer overflow

When the "Interval Limit" or the "totalized" constant is reached, a "Totalizer Overflow" system alarm is created.

Interval Limit

The attribute "Interval Limit" is that value of the "Interval Count" attribute which, when reached, will generate a "Totalizer Overflow" alarm. The highest possible value for the attribute "Interval Count" is 99,999,999.

Electrical energy example

A message should be generated after the "consumption" of 5 MWh of electrical power. The input in the attribute "Interval Limit" must therefore be 5 MWh. Once the interval count reaches its reporting level of 5 MWh, then a report is generated, the interval count is reset to "Zero", and a new totalizing period is started.

I/O Characteristic

The attribute "I/O Characteristic" enables the user to display special input and output characteristics (see Fig. 13) for analog inputs/outputs. Special characteristics permit, for instance, the adaptation of Excel 50/100/500/600/800 to many different sensor types. Ten individual input/output characteristics are available per Excel 50/100/500/600/800 controller.

Each special characteristic is assigned a name that can be recalled from the attribute "I/O Characteristic". Thus, the desired characteristic can be assigned to the selected datapoint.

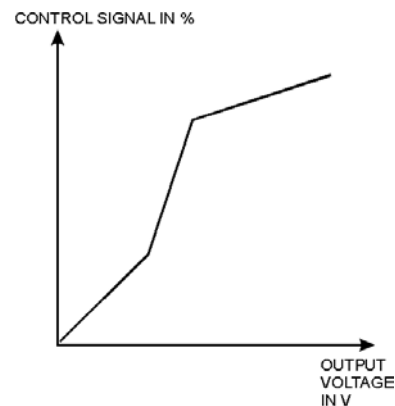


Fig. 13. Example of a special output characteristic

Creation of characteristics is carried out at programming level. Up to a maximum of four reference points can be specified per characteristic. Up to ten different characteristics can be defined for each controller.

For XFL and XFC I/O modules, user-defined characteristics are supported from CARE 5.0 and controller firmware 2.06.05 onwards.



CAUTION

Regarding I/O characteristic, the behavior of controllers with OS < 2.06.05 engineered using CARE 4 differs significantly from controllers with OS 2.06.05 and higher engineered using CARE 7 and higher. See also section "Controller OS 2.06 usage and functionality in CARE 4 and CARE – XL500 7.01.02" in Excel CARE – User Guide (EN2B-0182GE51).

Pull-Up Resistor Handling

Table 10. Pull-up resistor handling

device	pull-up						input circuit diagram (Fig. 14)	load-free voltage		
	voltage	hardware	de-activated by @ (8)	configured by DIP switch	configured by plug-in	activated for DI on AI		with NTC or low-impedance input	for voltage input or high-impedance input	
XF830A	10 V	optional switch-off	YES	NO	NO	YES	case 1	8.89 V	0 V	
XFU830A										
XF821A		fixed	NO		NO	NO	YES			case 2
XFL821A										
XF521, XF521A										
XF526										
XFL521, XFL521A/B	optional switch-off	YES ⁽³⁾	YES	config. ⁽⁶⁾	case 1	0 V				
Smart I/O XFC		YES ⁽⁴⁾								
XL20	10 V	fixed	NO	NO	NO	YES	case 2	8.89 V		
XL50		optional switch-off	YES ⁽²⁾			YES ⁽⁵⁾	case 1	0 V		
XL100, XL100A		fixed	NO			YES	case 2	8.89 V		
XL100B		optional switch-off	YES ⁽¹⁾			NO	configurable	case 1	0 V	
XL100C										YES ⁽⁵⁾

⁽¹⁾ controller firmware ≥ 2.03;
⁽²⁾ controller firmware ≥ 2.02;
⁽³⁾ controller firmware ≥ 2.03 (local/shared mode), CARE ≥ 5.00.01 (open mode);
⁽⁴⁾ CARE ≥ 5.00.01;
⁽⁵⁾ controller firmware < 2.04;
⁽⁶⁾ controller firmware < 2.04 (local/shared mode), CARE ≥ 5.01.xx (open mode);
⁽⁷⁾ CARE ≥ 5.01.xx;
⁽⁸⁾ Assigning "@" as first digit of input characteristic name (e.g.: "@0-10V") in the CARE text editor disables the pull-up resistor. When using the XF821A/XFL821A for current inputs, be sure to assign "@" as the first digit of the input characteristic name.

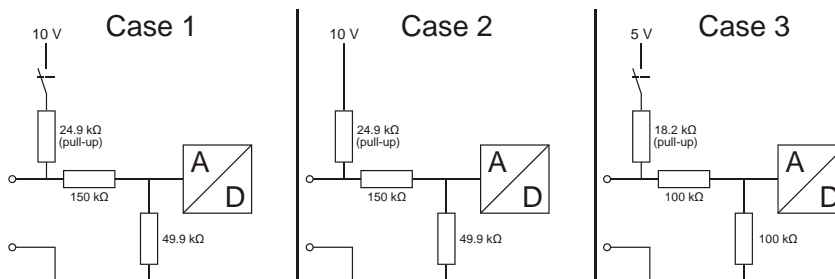


Fig. 14. Input circuit diagram

Last Change

In the attribute "Last Change", the last change of state of a digital input/output is stored with the time and date.

In this way it is possible to determine the last switch-on point of a fan, pump, etc. connected via a digital output.

In the case of analog inputs and pseudo analog points, the last time an alarm limit occurred is stored.

LED Mode (XF823x, XFL823x, and XF830x modules)

The XF823x Panel Bus Binary Input Module, the XFL823x Lonworks Bus Binary Input Module, and the XF830x / XFU830x modules support the "LED Mode" attribute, which can be set in the CARE datapoint editor. The following attribute options are provided:

- "Alarm" LEDs will be red/green (red = alarm state, not XF830x / XFU830x modules)
- "Status" LEDs will be yellow/off (yellow = active state)

NOTE: XF830x / XFU830x modules do not support the Alarm option. Hence, do not assign this attribute to datapoints allocated to one of these modules.

NOTE: When the XFL823x LONWORKS Bus Binary Input Module is used with non-Excel 800 controllers, the LED mode can only be set in the LONWORKS NV settings in CARE, and not in the CARE datapoint editor.

Maintenance Alarm

Specifying a maintenance alarm

In the case of those datapoints for which an hours run log has been activated, a time entry can occur within the attribute "Maintenance Alarm" to indicate after how many operational hours an alarm message should be generated. Entering "Zero" results in no alarm message.

Example:

Maintenance should be carried out every 500 hours on the heating circuit pump controlled via a digital output. To achieve this, a time interval duration of 500 hours is entered in the attribute "Maintenance Alarm" for this datapoint. At the same time, activation of the hours run log must also take place in the attribute "Hours Run log" for this datapoint. An alarm message now occurs after 500 hours, to bring to the operator's attention the necessary pump maintenance.

Manual Value

When the attribute "Operating Mode" is set to "Manual", the operator can enter a manual value or state, and the application program will work with this manual value or state until the operating mode is set back to "Automatic".

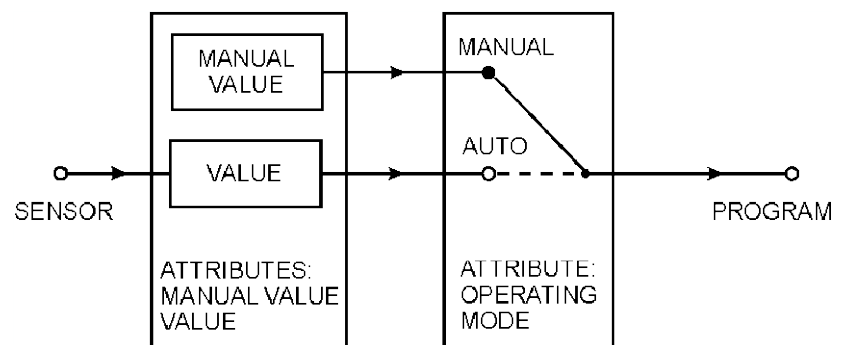


Fig. 15. Example of a sensor input

In Fig. 15, the attribute "Operating Mode" is set to "Manual", i.e. the value entered manually is processed in the application program.

NOTE:

"Value" and "Manual Value" are online attributes, relevant only during controller operation via MMI or XL-Online. Furthermore, "Manual Value" is an internal online attribute only, not visible to the operator! The operator will see only the online attribute "value", which can be edited only if the attribute "Operating Mode" is set to "Manual". See also section "Operating Mode" on page 29.

Network Variable (V2.04.xx or higher)

Datapoints which are mapped to network variables on the LONWORKS network have an attribute named "Network Variable" containing the network variable index (0-4095) and the network variable name which allows this information to be displayed on an MMI.

Normally Open/Normally Closed (V2.04.xx or higher)

The attribute "Normally Open/Normally Closed" defines the relationship between the input/output signal of a digital datapoint and its logical status. This attribute is also applicable when the digital point is the basic point of a flexible datapoint.

NOTE: The attribute "Active State" is fixed at 1 and is no longer relevant for applications designed for this controller firmware version. Applications designed for an older controller version will still work with this firmware though, and in that case the attribute "Active State" is still active.

Table 11 and Table 12 show the relationship between the I/O signals, the attributes, and the logical status for digital inputs and digital outputs, respectively.

Table 11. The attribute " Normally Open/Normally Closed " – Digital Inputs

input signal	NO/NC attribute	logical status	text displayed
Low (<2.5 V)	N.O.	0	passive
High (>5 V)	N.O.	1	active
Low (<2.5 V)	N.C.	1	active
High (>5 V)	N.C.	0	passive

Table 12. The attribute " Normally Open/Normally Closed " – Digital Outputs

output signal	NO/NC attribute	logical status	text displayed
Low (<2.5 V)	N.O.	0	passive
High (>5 V)	N.O.	1	active
Low (<2.5 V)	N.C.	1	active
High (>5 V)	N.C.	0	passive

In the open LON mode, the "Normally Open/Normally Closed" functionality is supported from CARE 5.0 and controller firmware 2.06.05 onwards.

CAUTION

Regarding "Normally Open/Normally Closed," the behavior of controllers with OS < 2.06.05 engineered using CARE 4 differs significantly from controllers with OS 2.06.05 and higher engineered using CARE 7 and higher. See also section "Controller OS 2.06 usage and functionality in CARE 4 and CARE – XL500 7.01.02" in Excel CARE – User Guide (EN2B-0182GE51).

Motor Run Time

Time to open / time to close

For actuators controlled via a three-position output, two values (time to open / time to close) can be entered in the attribute "Motor Run Time". This attribute defines the time required by the actuator to change from the "Open" to the "Closed" state, and vice versa.

If no value is entered for the "Time to Closed" motor run time, then the "Time to Open" motor run time is assumed automatically. In the case of the motor run-on time, when reversing directions, 1% of the "Time to Open" motor run time is added to the calculated time.

The three-position output relay energizes when the calculated run time reaches 500 ms. The stated run time always amounts to 500 ms or a multiple thereof. A calculated run time of, for instance, 1215 ms results in an actual run time of 1000 ms.



CAUTION

Regarding motor run time, the behavior of controllers with OS < 2.06.05 engineered using CARE 4 differs significantly from controllers with OS 2.06.05 and higher engineered using CARE 7 and higher. See also section "Controller OS 2.06 usage and functionality in CARE 4 and CARE – XL500 7.01.02" in Excel CARE – User Guide (EN2B-0182GE51).

Off Phase

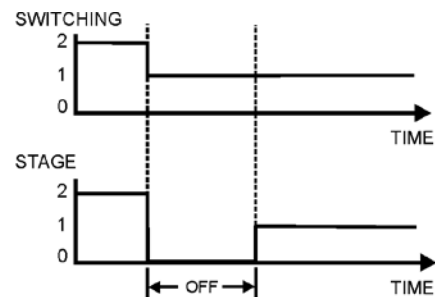


Fig. 16. Off phase

The attribute "Off Phase" is used in conjunction with flexible datapoints of the type "feedback". It defines the duration of the OFF phase on switching down. It is of relevance only if the attribute "Switching Down" is set to 0, i.e. if OFF phases are selected on switching down.

- Range: 0 to 255s
- Default value: 10s
- Resolution: 1s

The OFF phase has to be defined for devices with large inertia, such as fans.

Operating Mode

The attribute "Operating Mode" enables the user to switch between manual and automatic operation.

Automatic

Under automatic operation, the controller processes the values at the inputs, for instance from temperature sensors. For outputs, under automatic operation, the status shown by the user/time switch program is adopted, e.g., "Heating circuit pump off".

Manual During manual operation, the controller uses the manual values, for example, "flow temperature setpoint = 60°C". Outputs adopt the preselected condition, for example, "Heating circuit pump on".

Automatic/Manual Alarm For automatic operation, the attribute "Operating Mode" contains the inputs "Auto" and "Manual". Each switch from automatic to manual operation and back again generates a critical alarm.

Remote (V2.0.x) (not Excel 100C) If manual override controls are present on either the Analog Output (XFL522) or Digital Output (XFL524) modules connected via a LonWORKS network, then the status of these controls (automatic/manual override) is stored in the attribute "Operating Mode". If the manual override controls are set to automatic, the attribute "Operating Mode" can be set to either automatic or manual. If the manual override controls are set to manual override, then the attribute "Operating Mode" can be in the remote mode, only.

Fig. 17 and Fig. 18 demonstrate the relationship between the attribute "Operating Mode", and both the attributes "Value" and "Manual Value" for input and output functions.

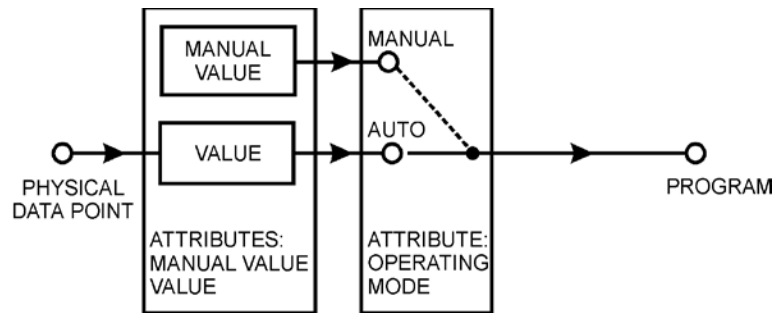


Fig. 17. Control flow for input functions

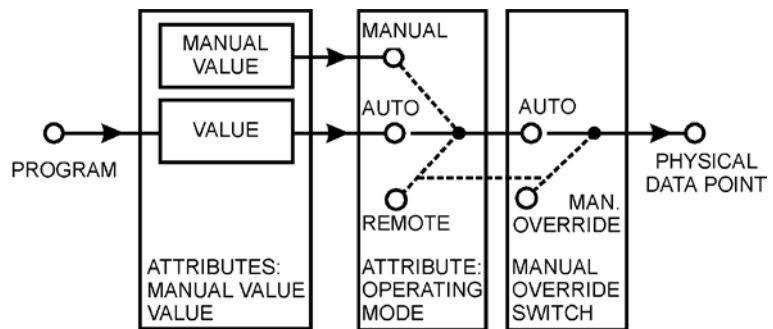


Fig. 18. Control flow for output functions

NOTE: The attribute "Remote" is available only if Manual Override modules are installed on the Distributed I/O output modules. This attribute is therefore not applicable to Excel 50/100/600.

Analog Points Table 13 indicates the analog point signals depending on the attribute "Operating Mode":

Table 13. Analog point signals

	auto operating mode	manual operating mode	remote** operating mode
automatic value*	20%	don't care	don't care
manual value	don't care	10%	don't care
remote value	don't care	don't care	50%
resulting value	20%	10%	50%
output signal	2 V	1 V	5 V

* Automatic value is either the physical point value (inputs) or the value from the program (outputs)

** Output only (V2.0.x)

Digital points

Table 14 indicates the digital point signals depending on the attribute "Operating Mode":

Table 14. Digital point signals

	auto operating mode	manual operating mode	remote** operating mode
automatic value*	ON	don't care	don't care
manual Value	don't care	OFF	don't care
remote value	n/a	n/a	ON
resulting Value	ON	OFF	ON
output signal	HIGH	LOW	HIGH
*Automatic value is either the physical point value (inputs) or the value from the program (outputs)			
**Output only (V2.0.x)			

Alarming

The change from the 'automatic' to the 'manual' mode will create a point alarm if other alarm conditions are set accordingly.

Firmware prior to V.2.04.x

With controller firmware prior to V.2.04.xx, the alarm will report the status of the operating mode as it was **before** the change.

Firmware V.2.04.x

Beginning with controller firmware V.2.04.x, the alarm will report the status of the operating mode as it is **after** the change.

Output Type

Analog or 3-position output

Three-position outputs are digital outputs. From an operational viewpoint, they are assigned the same datapoint description as analog outputs, i.e. a three-position output possesses attributes similar to those of an analog output.

The attribute "Output Type" determines whether the analog output datapoint description should be assigned to an analog output or to a three-position output. The following inputs are possible:

- Continuous The analog output datapoint description is assigned to an analog output.
- Three-position The analog output datapoint description is assigned to a three-position output.
- Remote three-position Output to the Excel 100 MCE 3 and MCD 3 output modules.

Subtype

The attribute "Subtype" is used in conjunction with digital outputs and flexible datapoints. It determines whether the digital output is of the non-pulsed type.

Point Alarms

The attribute "Point in Alarm" refers to alarm messages from the alarm attributes "Min. Limit", "Max. Limit", and "Alarm Status". The attribute "Point in Alarm" indicates whether or not those datapoints using these attributes are currently in alarm. The following entries are possible:

- Yes = the chosen datapoint is in alarm
- No = the chosen datapoint is not in alarm

- As soon as an alarm occurs (e.g. through exceeding a limit value), the attribute "Point in Alarm" is set to "Yes". The attribute is immediately set back to "No" when the limit value returns to normal.

Pulse Duration

The attribute "Pulse Duration" is used for the pulsed subtypes of the digital output (i.e. "Pulse 1") and flexible datapoints of the type "Pulse 2". It defines the duration between coming and going edge of a pulsed signal. The values for this attribute can vary from 1 to 255 seconds; the resolution is 1 second. The default value is 1 second.

NOTE: After a power failure or disconnection of the controller, the "Pulse 1" and "Pulse 2" outputs will resume their last output pulse behavior before the outage.

Safety Position (XFx822x, XFL824x, and XFL830x modules)

The analog output modules XF822x/XFL822x/XFLR822x, the relay output modules XFL824x/XFL824x/XFLR824x and the mixed I/O modules XF830x/XFU830x support the "Safety Position" attribute, which can be set in the CARE datapoint editor.

The modules will put the outputs into the safety position as soon as communication with the Excel 800 CPU is lost.

The XF822x/XFL824x modules detect this lost communication once no more polls are received from the Excel 800 CPU for more than one second.

The XFL822x/XFL824x and XF830x/XFU830x modules detect this lost communication once no more polls are received from the Excel 800 CPU within the heartbeat time of the module.

XF822x/XFL822x –"The following attribute options are provided:

- "0%" equals 0 Vdc or 2 Vdc (0...11 Vdc or 2...11 Vdc characteristic)
- "50%" equals 5 Vdc or 6 Vdc (0...11 Vdc or 2...11 Vdc characteristic)
- "100%" equals 10 Vdc
- "Remain in last position" (this is the default setting).

XFL824x/XFL824x and XF830x/XFU830x –"The following attribute options are provided:

- "Off (logical)"
- "On (logical)"
- "Remain in last position" (this is the default setting).

NOTE: When the XFL822x/XFLR822x and XFL824x/XFLR824x modules are used with non-Excel 800 controllers, the Safety Position can only be set in the LONWORKS NV settings in CARE, and not in the CARE datapoint editor.

Scaling Factor

Input pulses from utility meters (gas, water, heat, etc.) can be connected to the totalizer inputs using the attribute "Scaling Factor". The pulses supplied by the meters are multiplied by the scaling factor and are then ready to be read as pure consumption values. The "Scaling Factor" thus always indicates the value of each pulse received. The adjustable range is 0.0 through 100,000,000.0. The number of decimal places depends on the selected engineering unit.

Example: A heat meter supplies 10 pulses per kWh "consumed". Accordingly, the scaling factor (= value of a pulse) is 0.1 kWh/pulse.

Pseudo totalizers: In the event that you have selected the datapoint type "pseudo totalizer inputs," you must set the attribute "Scaling Factor" to "1"; otherwise, the number of pseudo totalizer inputs will not be counted.

Sensor Offset

Function principle

The attribute "Sensor Offset" is designed for the compensation of the resistance of the sensor wiring for low-resistance sensors, like Pt 100, Pt 1000, Balco 500. The voltage offset due to the wire resistance is approximately constant, the attribute "Sensor Offset" functionality has therefore been designed to compensate constant voltage offsets at the analog input.

The principle is that the attribute "Sensor Offset" can be defined at a selected temperature, e.g., 1 °C at 20 °C. The Excel controller processes this temperature offset into a voltage offset, e.g., -0.11 V, and applies this very voltage offset for correcting (offsetting) all voltages measured.

In order to display a temperature, the controller processes the resulting voltage back into a temperature. This principle and the processing (including mathematical rounding) from "°C" into "volt" and back into "°C" leads to slightly inconstant offsets across the temperature range.

Example for a selected "Sensor Offset" of 1°C:

Measured Temperature	Corrected Temperature
20°C	19°C
-10°C	-8,4°C

For XFL and XFC I/O modules, "Sensor Offset" functionality is supported from CARE 5.0 and controller firmware 2.06.05 onwards.



CAUTION

Regarding sensor offset, the behavior of controllers with OS < 2.06.05 engineered using CARE 4 differs significantly from controllers with OS 2.06.05 and higher engineered using CARE 7 and higher.

For example, for XL50 internal AI and XL500 internal AI (XF521/527 modules), the sensor offset is subtracted from the datapoint value.

For XL50 and XL800 controllers using XF821 modules, the sensor offset is added to the datapoint value.

See also section "Sensor Offset Handling" in Excel CARE – User Guide (EN2B-0182GE51).

Suppress Point

The attribute "Suppress Point" means that datapoints are no longer processed and checked. As a result, no alarms are generated for suppressed points. Where you have flexible datapoints, this attribute acts upon all basic types of physical datapoints.

IMPORTANT

Never suppress a datapoint used via your application program. This causes system failure.

Switching Down

The attribute "Switching Down" is used in conjunction with flexible datapoints of the type "feedback". On switching down from one stage to another, it determines

whether the off-phase is selected between the single stages, e.g., for ventilators, or whether the next lower stage is selected directly, e.g., for electrical air heaters.

Switching down	Switching down behavior
0	3, OFF, 2, OFF, 1, OFF
1	3, 2, 1

Switch-On Counter

Record switching frequency The attribute "Switch-On Counter" gives information about the switching frequency of digital datapoints. The change of state from 0 to 1 is counted in each case.

Technical Address

Technical address An Excel 500/600 controller consists of 16 Distributed input/output modules with a total of 128 physical inputs and outputs. The Excel 100C provides 36 physical I/Os (see Excel 100C Installation Instructions, form no. EN1R-0144GE51, for technical addresses). Where a system requires additional inputs and outputs, several controllers can be connected together. Controllers then communicate with one another via the system bus.
 Each physical datapoint within the system must have an address that identifies the point uniquely. The technical address contains information about the controller number, the I/O module number, and also the input/output number in this module (see Fig. 19).

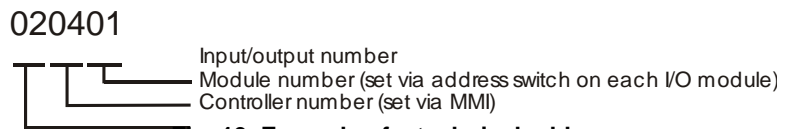


Fig. 19. Example of a technical address

Thus, the address 02.04.01 uniquely identifies the first input/output in the fourth module of the second controller in your system.

NOTE: The Excel 50 controller does not have I/O modules, but its technical addresses follow the same pattern, with module numbers referring to internal I/O boards. For details, see the Excel 50 Installation Instructions.

Mapped points (V2.04.xx or higher) Datapoints that are mapped only to LONWORKS network variables are not assigned to any I/O board. In this case, the board number (module number) of the technical address is zero.

Trend Logging

Up to 20 datapoints (all datapoint types, except for global datapoints) in each controller can be trend logged simultaneously. This means changes in the input or output value can be stored with the user address, value (or status), date, and time for 20 different datapoints. This is achieved by selecting the attribute "Trend Logging" to YES in the datapoint description.

For analog values (see Fig. 20), the value, e.g., 20 °C / 68 °F, is displayed in addition to the user address, date, and time. For digital values (see Fig. 21), the status text, e.g., "On", is displayed in addition to the user address, date, and time.

Trend log:		Outdoor temp.	
31.07.97	11:20	17.6°C	↑ ↓
31.07.97	11:07	17.0°C	
31.07.97	10:45	16.4°C	
31.07.97	10:03	16.0°C	
31.07.97	09:23	15.6°C	

Fig. 20. Trend log display (analog input)


Trend log:		Extract fan	
31.07.97	17:00	off	
31.07.97	16:22	on	
31.07.97	13:45	off	
31.07.97	09:23	on	
31.07.97	06:10	off	

Fig. 21. Trend log display (digital input)

200 values can be written to the local trend log memory. If the memory is full, the earliest data is overwritten with new data. The 200 most up-to-date values are always available in the memory.

If several datapoints are selected for the trend log, those datapoints whose value or status changes more frequently will create a larger number of values to be logged. Each change in status is logged for digital points. For analog points, there are two different types of trending: value hysteresis and time-based. The datapoint attributes for each of these types of trending are described below.

Value Hysteresis

When value hysteresis trending is selected (i.e. when the attribute "Trend Cycle" is set to 0), a new value is written to the memory when the point changes more than the given hysteresis compared to the previous value.

The default hysteresis value is 1% of the actual value, but not less than 0.2 (see also section "Trend Hysteresis" on page 22).

Example 1: The current measured value is 20°C
 1 % of 20°C = 0.2°C
 A new trend log value is stored at either 20.2°C or 19.8°C

Example 2: The current measured value is 9°C
 A new trend log value is stored at either 9.2°C or 8.8°C
 The trend can be displayed as text and as a graphic. The graphic display offers the following features:

- Simultaneous display of an analog and a digital datapoint
- Auto-scaling of the time and the value axis
- Scrolling the time axis
- Manual re-scaling of the time axis (ZOOM/UNZOOM function) with possible resolutions:
 - minute display
 - hourly display
 - daily display
 - weekly display
- Quick change between graphic and text display

Trend Cycle (V2.03.x)

With V2.03.xx firmware, it is possible to perform time-based trending for physical and pseudo analog points for both local and remote trending. A trend value is stored in the trend buffer at the end of a fixed interval given by the datapoint attribute "Trend Cycle", as shown in Fig. 22:

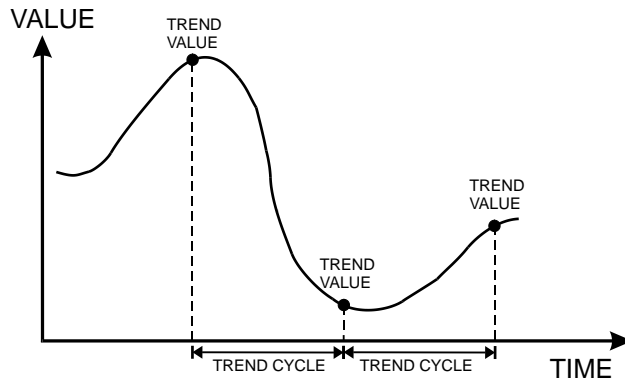


Fig. 22. The attribute "Trend Cycle"

The value of the attribute "Trend Cycle" is given in minutes, and the valid range is 0 to 1440 min (=24 hours). A trend cycle value of 0 will disable time-based trending (this is the default) and value-hysteresis trending is used if the trend log attribute is set. The value for the attribute "Trend Cycle" can be changed via the MMI, C-Bus, or modem connection to EBI/SymmetrE, and also via CARE RIA/WIA statements.

NOTE If the attribute "Trend Cycle" is set to anything other than 0, trending will be time-based and the attribute "Trend Hysteresis" will be ignored.

User Address

The attribute "User Address" is a sequence of up to 18 letters and numbers assigned to each datapoint (physical and pseudo).

Example

The temperature of a room is recorded at a sensor input; the associated user address could be as follows:

Room Temp.1.10 (Room temperature, 1st floor, room 10)

The datapoint can be accessed directly by selecting this user address on the XI581 (not with XCL5010, Excel 100C), XI582, and XL-Online operator interfaces or the XL50-MMI.

In the case of basic types of physical data, a user address always corresponds exactly to one technical address (see Table 15).

The user address of flexible datapoints may refer to up to six technical addresses.

Table 15. Number of technical addresses for flexible datapoints

flexible datapoint	number of technical addresses
Pulse 2	2
Multi-stage	up to 6
Feedback	up to 6 (in pairs of 2)

Value

When the controller is working in automatic (the attribute "Operating Mode" is set to "Auto"), the value currently being processed by the program, or the current status, can be found in the attribute "Value". The attribute "Value" for an analog input could contain, for example, the current room temperature of 21 °C / 70 °F.

A pump switched by a digital output could contain the current status of the pump, for example ON, in its attribute "Value".

Write Protection

The attribute "Write Protection" (XBS, only) prevents data from being overwritten. The default setting of the attribute is 0 (= "No"). If the datapoint should be protected, then "No" must be overwritten with a value between 0 and 100.

0 = No write protection
100 = Highest priority required

To change this attribute, the operator must log in at an operator level that corresponds to the current write protection attribute (see Table 16).

Table 16. Access values for operator levels

operator level XBS	access for write protection values
1	no access
2	no access
3	0 to 60
4	0 to 80
5	0 to 100

The operator's authority level is compared to the write protection status of the datapoint to establish whether or not any modification can be made. As soon as the operator receives permission, he can alter the attribute of secured datapoints. The operator can also set the write protection to a higher value or cancel write protection completely.

Example: A datapoint with a write protection value of 61 can be altered only at operator level 4 or 5. The write protection can be reduced to 0 from level 4 as well as level 5. The datapoints can be altered through level 3. A detailed high priority can then be given through the write protection.

NOTE: When online, the XI581 (not with XCL5010, Excel 100C), XI582, and XL-Online operator interfaces and the XL50-MMI do not recognize the attribute "Write Protection". You can still change any datapoint via the user interface, even if the datapoint is write-protected.

List of Datapoint Attributes

Different attributes are assigned to each datapoint type. Table 17, Table 18, and Table 19 list the attributes assigned to the various datapoint types:

Table 17. Datapoint attributes

analog input	analog output	digital input	digital output	digital output (pulse 1)
User Address	User Address	User Address	User Address	User Address
Descriptor	Descriptor	Descriptor	Descriptor	Descriptor
Technical Address	Technical Address	Technical Address	Technical Address	Technical Address
Suppress Point	Suppress Point	Suppress Point	Suppress Point	Suppress Point
Access Level	Access Level	Access Level	Access Level	Access Level
Write Protection	Write Protection	Write Protection	Write Protection	Write Protection
Operating Mode	Operating Mode	Operating Mode	Operating Mode	Operating Mode
Value	Value	Value	Value	Value
Manual Value	Manual Value	Manual Value	Manual Value	Manual Value
Engineering Unit	Engineering Unit	Alarm Delay	Alarm Type	Alarm Type
I/O Characteristic	I/O Characteristic	Alarm Type	Alarm Reporting	Alarm Reporting
Sensor Offset	Alarm Reporting	Alarm Status	Trend Logging	Trend Logging
Low Warning Limit	Trend Logging	Point in Alarm	Hours Run Log	Hours Run Log
Low Alarm Limit	Subtype	Alarm Reporting	Hours Run	Hours Run
High Warning Limit	Time to Open	Trend Logging	Service Interval	Pulse Duration
High Alarm Limit	Time to Close	Hours Run Log	Hours Since Serviced	Service Interval
Alarm Delay	Trend Hysteresis	Hours Run	Active State	Hours Since Serviced
Alarm Type	Trend Cycle	Service Interval	Active State Text	Active State
Point in Alarm	Suppress Alarm	Hours Since Serviced	Passive State Text	Active State Text
Alarm Reporting	NV Name and Index	Active State	Cycle Count	Passive State Text
Trend Logging	Safety Position ¹	Active State Text	Last Changed	Cycle Count
Alarm Status changed		Passive State Text	Subtype	Last Changed
Alarm Hysteresis		Last Changed	Suppress Alarm	Subtype
Trend Hysteresis		Cycle Count		Suppress Alarm
Trend Cycle		Suppress Alarm		NV Name and Index *
		Normally Open / Normally Closed	Normally Open / Normally Closed	
Suppress Alarm		NV Name and Index *	NV Name and Index *	
NV Name and Index *		LED Mode ¹	Safety Position ¹	
* Read-only attribute. Changing the NV name and index requires changing the datapoint to NV mapping in CARE.				
¹ Excel 800, only.				

Table 18. Datapoint attributes

totalizer input	pseudo totalizer input	pseudo analog point	pseudo digital point	pseudo point multistage
User Address	User Address	User Address	User Address	User Address
Descriptor	Descriptor	Descriptor	Descriptor	Descriptor
Technical Address	Suppress Point	Access Level	Access Level	Point Enable
Suppress Point	Access Level	Write Protection	Write Protection	Access
Access Level	Write Protection	Operating Mode	Operating Mode	Write protection
Write Protection	Operating Mode	Value	Value	Operating Mode
Operating Mode	Value	Manual Value	Manual Value	Value
Value	Manual Value	Engineering Unit	Alarm Type	Value Manual
Manual Value	Engineering Unit	Low Warning Limit	Alarm Delay	Status Text
Engineering Unit	Alarm Type	Low Alarm Limit	Alarm Status	Alarm Type
Alarm Type	Trend Logging	High Warning Limit	Point in Alarm	Trend Logging
Trend Logging	Scaling Factor	High Alarm Limit	Alarm Reporting	Hours Run log
Scaling Factor	Interval Limit	Alarm Type	Trend Logging	Hours Run
Interval Limit	Interval Value	Alarm Delay	Hours Run Log	Maintenance Alarm
Interval Value	Suppress Alarm	Point in Alarm	Hours Run	Last Serviced
Suppress Alarm		Trend Logging	Service Interval	Last Change
		Alarm Status changed	Active State	Switch on Counter
		Alarm Hysteresis	Hours Since Serviced	Number of Stages
		Trend Hysteresis	Active State Text	Suppress Alarm
		Trend Cycle	Passive State Text	NV Name and Index *
		Suppress Alarm	Cycle Count	
		NV Name and Index *	Last Changed	
			Suppress Alarm	
			NV Name and Index *	

* Read-only attribute. Changing the NV name and index requires changing the datapoint to NV mapping in CARE.

Table 19. Datapoint attributes

global datapoint (analog)	global datapoint (digital)	flexible datapoint (type: Pulse 2)	flexible datapoint (type: feedback)	flexible datapoint (type: multi-stage)
User Address	User Address	User Address	User Address	User Address
Descriptor	Descriptor	Descriptor	Descriptor	Descriptor
Technical Address	Technical Address	Technical Address 1/2	Technical Address 1/2/3/4/5/6	Technical Address 1/2/3/4/5/6
Access Level	Access Level	Suppress Point	Status	Suppress Point
Write Protection	Write Protection	Access Level	Switching down	Access Level
Operating Mode	Operating Mode	Write Protection	Off phase	Write Protection
Value	Value	Operating Mode	Delay switch up	Operating Mode
Manual Value	Manual Value	Status	Delay switch down	Value
Engineering Unit	Alarm Type	Manual Status	Feedback Delay	Manual Value
Low Warning Limit	Alarm Delay	Status Text	Operating Mode	Status Text
Low Alarm Limit	Alarm Status	Alarm Type	Manual status	Active State
High Warning Limit	Point in Alarm	Trend Logging	Status Text	Alarm Type
High Alarm Limit	Alarm Reporting	Hours Run Log	Suppress Point	Alarm Reporting
Alarm Type	Trend Logging	Hours Run	Access Level	Trend Logging
Alarm Delay	Hours Run Log	Pulse Duration	Write Protection	Hours Run Log
Point in Alarm	Hours Run	Service Interval	Trend Logging	Hours Run
Trend Logging	Service Interval	Hours Since Serviced	Hours Run Log	Service Interval
Alarm Status changed	Active State	Last Changed	Hours Run	Hours Since Serviced
Alarm Hysteresis	Hours Since Serviced	Cycle Count	Service Interval	Last Changed
Trend Hysteresis	Active State Text	Suppress Alarm	Subtype	Cycle Count
Trend Cycle	Passive State Text		Hours Since Serviced	Suppress Alarm
Suppress Alarm	Cycle Count		Alarm Type	
Broadcast Hysteresis	Last Changed		Point in Alarm	
	Suppress Alarm		Alarm Reporting	
			Last Changed	
			Cycle Count	
			Suppress Alarm	

TIME PROGRAMS

Time programs allow you to set values and control states for specific datapoints at specific times. You can adapt time programs to suit the structure of your system.

Network-wide time synchronization

Time synchronization of all devices connected to the system bus is carried out by the controller designated as the synchronization master. Synchronization is based on date, hours, minutes, and seconds to an accuracy of ± 120 seconds (see also "Network-Wide Controller Time Synchronization" on page 55).

Structure

Flexible time programs

An Excel 50/100/500/600/800 time program can consist of several individual time programs. You define these individual time programs according to their function and assign a name to each one. This means you can generate a time program for each section of your system or building.

Time programs are created on the basis of the following modules:

- daily programs
- weekly programs
- annual programs

Further, these modules can be modified as needed using the following two functions:

- the special day list
- the "TODAY" function

Daily programs are combined to form a weekly program. The weekly program is then automatically copied repeatedly to form the annual program. If you need to execute a different daily program on certain days of the year, you can enter the customized daily program directly in the annual program. The special day list and the "TODAY" function are available as additional features. The special day list allows you to mark specific days as being legal holidays. You can also use the special day list for floating legal holidays, for example Good Friday and Easter Monday. The "TODAY" function allows you to overwrite time program assignments "ad hoc" for a defined time period without permanently changing the entire time program.

Individual Time Programs

Daily Program

Daily programs are the basic building blocks of any time program. Using daily programs, you enter the switching times with the desired setpoints and switching conditions for the datapoints. When preparing a daily program and assigning the name, there is initially no specific relationship to a particular day in the week. The modular structure of the time program makes it possible for the user to establish various different daily programs, keep them in a library, and to include them in the weekly program as desired. The user is free to extend the list of daily programs to meet his special requirements.

The repeated use of the same daily program is also possible (for example, the same daily program can apply from Monday to Friday in the weekly program). Changes in a daily program are immediately effective in the weekly and annual programs as well as in the special day list.

A daily program can also have the name "Sundays and holidays", for example. The names of the daily program provide a reference to the switching points. In the "Workday 22 hr" daily program, the setpoint is reduced from 22.0°C to 12.0°C at 22.00 hr.

The daily programs of the heating loops are independent from each other. In spite of their having the same name, such as "Sunday and holidays", the daily programs for all heating circuits are distinguished through the user addresses defined. The same also applies to the service water loop daily programs. The switch points and values can therefore be changed as desired in any daily program without influencing another daily program. The exact procedure for creating a daily program is described in the Operating Instructions.

Switching points

A daily program can be regarded as a module that contains information about switching times related to the duration of one day. It contains all user addresses addressed in this time interval.

The number of switching points per user address is not restricted. These switching points are defined by means of a switching time, referenced user address, and a setpoint value or control state. The switching times are set to the minute. Several switching points can be allocated to one switching instant. Switching points can be re-entered, changed, or deleted to modify the daily program. The permissible range (minimum or maximum value) for a user address or its control state is defined in the datapoint description. No values may be entered outside this range.

New daily program

Daily programs can be generated at operator level 2 (read and limited changes) of the XI581 (not with XCL5010, Excel 100C), XI582, and XL-Online operator interfaces and the XL50-MMI. It is possible to assign a name to a daily program generated on the XL-Online.

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The daily program is automatically assigned the name "DPn" (English language) or "TPn" (German language) (n = sequence power of the daily program) if no name is assigned by the user or, if the program is generated on the XI581 (not with XCL5010, Excel 100C), XI582, or the Excel 50 MMI. Once selected, program names can be changed via the XL-Online.

Application

Daily programs are used in the following sections of time programs:

- To generate weekly programs
- For direct entries in annual programs
- For holidays in the special day list

Deleting a daily program

If a daily program is to be deleted, the system will check whether this program is still required in the time program. This daily program cannot be deleted if it is still contained in the time program.

Weekly Program

A separate weekly program is generated for each time program. The weekly program defines which daily program is to be used for which weekday. A daily program is assigned to each day of the week (Monday to Sunday). It is also possible to assign the same daily program to several weekdays. The weekly program, if defined, is automatically copied for each week in the annual program. If a change is made to a weekday in a weekly program, this change will affect the weekday in every week of the year. If a daily program is entered directly in the annual program, this daily program will have priority over the daily program from the weekly program. The definition of a weekly program forms the basis of the annual program.

Annual Program

The annual program is structured like a calendar and consists of successive weekly programs. It provides an overview of which daily programs are valid on which calendar days. If the daily program in a weekly program does not apply on a particular calendar date, another daily program can be entered for it directly in the annual program.

The annual program starts on the current day. Each day, the time frame shifts one day. Days added at the end are automatically assigned the daily program from the weekly program. This ensures that every day is assigned a daily program.

Entries in the annual program must therefore be made only if a daily program differing from the one selected is to be used. An undefined daily program to be inserted in the annual program can be defined in the daily program.

Special Day List

One special day list exists per time program. It makes a number of holidays and special days available to which a daily program can be assigned. This daily program will then apply to this holiday or special day every year. The date of floating holidays is calculated automatically by the Excel 500. If no daily program is entered on certain holidays, the special day list is not taken into account on this day. The following holidays and special days are contained in the list:

- New Year's Day (1st of January)
- Epiphany (6th of January)
- Monday before Ash Wednesday
- Shrove Tuesday
- Ash Wednesday
- Good Friday
- Easter Sunday
- Easter Monday
- Labor Day (1st of May)
- Ascension Day
- Whit Sunday
- Whit Monday
- Corpus Christi
- Assumption Day (15th of August)
- Day of German Unity (3rd of October)
- Reformation Day (31st of October)
- All Saint's Day (1st of November)
- Day of Prayer and Repentance
- 1st to 4th Sundays in Advent
- Christmas Eve (24th of December)
- Christmas Day (25th of December)
- Boxing Day (26th of December)
- New Year's Eve (31st of December)
- First Saturday in the month (Germany)

If a daily program that has not yet been defined should be entered in the special day list, it must first be defined in the "Daily program" section of the time program.

NOTE: To activate the special day list, you must set the special day status to ON.

The "TODAY" Function

Using the "TODAY" function, it is possible to perform on/off changes to setpoint values or control states without having to access the annual program or to define a new daily program. New setpoint values or control states and the period of validity (i.e. start and end) for a specific user address are defined. These changes are carried out at operator level 2 of the XI581 (not with XCL5010, Excel 100C), XI582, and XL-Online operator interfaces or the Excel 50 MMI. The start time must be within 24 hours from the entry time. The end time must be within 24 hours from the start time. The duration of the change can thus amount to a maximum of 24 hours. The entry is deleted automatically after the end time point is exceeded.

Generating a Time Program

A new time program is defined at operator level 4 (programming level) of XL-Online or on the Excel CARE engineering system. The new time program is given a name

and assigned a user address. This process thus defines which user addresses are to be referenced by the time program.

Up to 20 time programs can be defined for each Excel 500. The time programs are extremely flexible. The switching points for a section of the system or building are usually combined in one time program. It is also possible to combine all datapoints in one time program.

The following steps can also be carried out at operator level 2 (read and limited changes) of the XI581 (not with XCL5010, Excel 100C), XI582, and XL-Online operator interfaces and the XL50-MMI.

- 1) Daily programs are generated and given a name.
- 2) User addresses with a switching time and setpoint value or control state are entered in the daily program.
- 3) A daily program is assigned to each weekday in the weekly program section after the daily programs have been generated.
- 4) This weekly program is automatically copied for each week in the annual program.

The generation of an executable time program is now complete.

If, on a certain day in the annual program, a daily program differing from the one specified in the weekly program is to be used, this new daily program can be entered directly in the annual program. The defined weekly program is not modified and continues to be used on those days which have not been modified, in any way, in the annual program.

Any changes to be made to switching times, setpoint values, or control states must be carried out in the daily programs.

The special day list is available. It contains a number of holidays; a different daily program can be assigned to each holiday. Once assigned to a holiday, the daily program will apply on this holiday every year. That is valid for holidays with fixed date (for example New Year's Day or Christmas Eve) as well as for floating holidays (Ascension Day, Good Friday). The dates of floating holidays will be calculated automatically by Excel 500. If there are no entries, then the existing daily program of the annual program remains valid on that holiday.

ALARM HANDLING

The Excel 50/100/500/600/800 alarm handling facility offers a high degree of security by both storing and immediately displaying all alarms that occur at the operator interfaces. The user chooses whether an alarm is critical or non-critical. The user can also create personalized alarm texts, if required.

If your Excel 50/100/500/600/800 is connected to a front-end or a modem, critical alarms are transmitted as high priority.

Point Alarms

The type of alarm generated by a datapoint depends on the type of datapoint involved. Furthermore, there are alarm types which are valid for all datapoints or which refer to system alarms in the control unit.

Limit monitoring

In the case of an analog input or pseudo analog point, two maximum limits (limit Max. 1, limit Max. 2) and two minimum limits (limit Min 1, limit Min 2) can be set for a particular value. The limit values are entered in the datapoint description. Each time this limit value is reached, irrespective of the direction, an alarm is triggered. If, for example, a measured value takes on a value that exceeds a maximum limit or drops below a minimum limit, an alarm is generated (alarm reached). If the value returns from the alarm range to the normal range and, in doing so, reaches a limit value in the opposite direction, an alarm signal is given in the same way (alarm reached). Since this sequence is identical for all four limit values, a total of eight different alarm signals are possible for one analog datapoint. These eight alarm signal texts are programmed permanently, and require no input from the user.

Alarm status

In the case of a digital input or pseudo digital point, a decision can be made whether or not an alarm check is desired. The entry is made in the datapoint description.

Prior to V.2.04.x

Alarm Check	Enter "Yes"
No Alarm Check	Enter "No"

If an alarm check is desired, an alarm signal is produced if the digital point changes from Active State to Passive State (alarm reached). When the digital point returns to Active State, an additional signal is generated (alarm going). The two alarm signal texts are permanently programmed and require no input from the user. The fixing of active and passive states must be carried out in the datapoint description under the attribute "Active State".

0 = Active state with "0" signal
1 = Active state with "1" signal

V.2.04.x

The attribute "Active State" is fixed to "1". This means that the alarm status is no longer dependant upon the attribute "Active State", but rather only upon the physical contact status and upon the logical status as defined in the online attribute "Normally Open/Normally Closed".

Maintenance Alarm

In the case of a digital input, a digital output, or a pseudo digital point, the hours run time entry can be activated and a maintenance interval can be fixed. If the latter is exceeded, an alarm signal is generated. The text of this signal is permanently programmed and requires no input from the user. If a check is to be skipped, a "0" is entered in the datapoint descriptor under the attribute "Maintenance Interval".

Totalizer

A pulse input signal interval can be fixed for a totalizer input that, if exceeded, triggers an alarm signal. The alarm signal text is permanently programmed and requires no input from the user. If a check is not desired, a "0" is entered in the datapoint description under the attribute "Interval Count".

Operational status	All datapoints can be switched from the 'automatic' to the 'manual' operational mode. Each time the operating mode is changed, irrespective of the direction involved, a critical alarm signal is generated. Both alarm signal texts are preprogrammed and require no input from the user.
Remote (V2.0.x) (not with Excel 100C)	If a manual override control is changed on a Distributed I/O module, an alarm "overr.switch_manu" or "overr.switch_auto" is generated and the "manu" value is transmitted.
Alarm suppression in manual mode	<p>Under controller firmware 2.06.02 and higher, the following datapoint alarms can be suppressed for as long as the corresponding datapoints are in the 'manual override' mode:</p> <ul style="list-style-type: none"> • min. and max. limit alarms (of analog datapoints, only); • status alarms (of digital datapoints, only). <p>This alarm suppression is activated during CARE engineering by inserting the "at" sign ("@") at the beginning of the descriptor text of the pseudo datapoint "Startup".</p> <p>Benefits: As long as this alarm suppression is in effect, the repair or replacement of defective and/or malfunctioning (flickering) inputs (resulting e.g. from sensor breakage, sensor short-circuiting, defective alarm switches, etc.) can be performed while the corresponding datapoint is in the "manual override" mode.</p> <p>NOTE: Only when using XFI 2.1.0 SIM1 will the event behavior and visualization behavior be identical to that of Honeywell Deltanet controllers.</p>

System Alarms

Operating errors that occur in a control unit or during communication with other Excel 50/100/500/600/800 units are recognized and displayed by the computer module. These alarm signals can relate, for example, to a defective module, the need to change the buffer battery (data protection), or the presence of one digital output module too many (maximum 10). These alarm signal texts are preprogrammed. They are always critical alarms.

Table 20. System alarms

Alarm no.	alarm text English)	cond. code #	cause/reason
1	AI Module Defect	25	Maximum conversion time was exceeded while testing ADC (defect on an AI card).
2	AI 0 Volt Error	24	While measuring GND voltage on an AI card, one value greater than 0.5 V was measured (AI card defect).
3	AI 5 Volt Failure	23	While measuring the 5-V reference voltage on an AI card, one value greater than 5 V or smaller than 4.5 V was measured (AI card defect or incorrect power supply of AI card).
4	MAX 2 alarm	2	Alarm limit for AI-, PA points
5	MAX 2 normal	76	Alarm limit for AI-, PA points
6	MAX 1 alarm	1	Alarm limit for AI-, PA points
7	MIN 2 alarm	4	Alarm limit for AI-, PA points
8	MIN 2 normal	78	Alarm limit for AI-, PA points
9	MIN 1 alarm	3	Alarm limit for AI-, PA points
10	MAX 1 normal	75	Alarm limit for AI-, PA points
11	MIN 1 normal	77	Alarm limit for AI-, PA points
12	Alarm memory full	22	1) After starting the Field I/O Task with the parameter "INIT", the default datapoint description couldn't be installed because USX didn't provide enough storage space for sending CNAP telegrams. 2) Alarm send buffer full.
13	Alarm	6	Alarm condition control for DI , PD points.

Alarm no.	alarm text (English)	cond. code #	cause/reason
14	Return to normal	79	Alarm condition control for DI, PD points.
15	Hware clock failed	61	Error while initializing the system clock.
16	Battery low	17	Battery voltage too low or battery not existent.
17	Battery status OK	87	Battery voltage back to normal again (alarm occurs only after alarm message "Battery low").
18	Wrong Module ID	71	An invalid module ID is read (error on internal I/O or defect module or the module has an as-yet unspecified module ID).
19	Too Many DO Module	60	Too many modules of the same type (XF521, XF522, ...).
20	Contr. w/o Flash	81	Error occurred when burning the Flash EPROM.
21	FLASH Mem Full	82	Not enough Flash memory space to save application.
22	Link Point Alarm	-	Xlink alarm.
23	Link Comm Down	-	Xlink alarm.
24	No characteristic	57	The application part "Characteristics" is defect.
25	RCL Submod missing	-	RACL sub-module missing.
26	Download SSI Now	-	Xlink alarm.
27	Download CPU Now	-	Xlink alarm.
28	RACL inconsistent	29	Incompatible version numbers of RACL program and RACL parameter files and/or datapoint description.
29	Nested submodules!	30	RACL program contains errors (MCAL from submodule).
30	alarm message 158	-	Alarm not used.
31	RACL undef. OpCode	32	RACL program contains errors (undefined Operation code).
32	RACL program fault	33	RACL program contains errors (Checksum changed).
33	Unknown datapoint	34	1) During RACL run, datapoint contains errors or point is locked. 2) An unrecognized (missing) characteristic in the datapoint editor has been used. Check if the default file set of the controller is different from the set used in CARE.
34	SSI Points Active		Xlink alarm.
35	Invalid operation	36	Non-valid arithmetical operation during RACL performance (e.g. division by zero or RACL statements LN with input value 1.0).
36	RACL overflow	37	Arithmetic overflow at RACL performance "+infinite".
37	RACL neg. overflow	38	Arithmetic underflow at RACL performance "-infinite".
38	RACL inval. OpCode	39	RACL program contains errors (invalid Operation Code).
39	Z-Reg. index error	40	Access to non-existing Z register (e.g.: RACL statements ISTO and IRCL).
40	Invalid Y-Register	41	Too many statements (exits) in one column.
41	Invalid P-Register	42	Attempt to use non-existent P register.
42	Invalid T-Register	43	Attempt to use non-existent T register.
43	Invalid Z-Register	44	Attempt to use non-existent Z register.
44	SSI Interface Up	-	Xlink alarm.
45	No parameter file	-	RACL parameter file missing.
46	No Z file	-	RACL Z register file missing.
47	No T file	-	RACL time register file missing.

Alarm no.	alarm text (English)	cond. code #	cause/reason
48	Part applic. miss	46 47 48 49 52	1) No RACL program. 2) No parameter file. 3) No Z register file. 4) No T register file. 5) No datapoint description.
49	RACL environ fault	26 27 28 31 34 1	1) Submodule does not exist. 2) Parameter file missing. 3) No M0 module. 4) Invalid SKIP destination. 5) Info points STARTUP, SHUTDOWN, or EXECUTING_STOPPED are missing or 6) During RACL start datapoint contains errors. 7) freely programmable application loaded into Excel 50 controller (system alarm parameters set to 0,0,0).
50	INIT div. by zero	14	Reason of new start: Division by zero.
51	INIT under OpCode	15	Reason of new start: the system software contains an undefined Operation Code.
52	Power failure	16	Reason of new start: power failure, data in RAM ok.
53	Link Config Bad	-	Xlink alarm.
54	I/O board missing	19	The required configuration contains at least one module which is not included in the hardware configuration.
55	Unused I/O board	18	The hardware configuration contains at least one module that is not needed (can be taken out).
56	HW Config. failure	20	1) Hardware Configuration file (.kfx file) not complete loaded. 2) Different modules are plugged under the same address (set using the rotary HEX switch) in the required configuration and in the hardware configuration. 3) An application containing NV-mapping is rejected by the target controller because the hardware does not have the 3120E5 Neuron® chip.
57	Wrong version no.	21	The version number of the application files and the configuration file are not the same.
58	Totalizer overflow	5	Overflow operation hours counter, point value of counters and interval impulse counter.
59	Maintenance alarm	7	Course of a service interval for digital points or course or the message/calling interval for counters. Call intervals for counters.
60	Undef. RACL input	62	Undefined RACL errors.
61	Too many Globals	63	The loaded application contains too many remote points. An application with more than 46 NVs has been rejected for download into an Excel 50 freely programmable controller located on a LONWORKS network.
62	C-Bus error	64	Communication defect/disturbance between Excel 500 and C-Bus submodule. Logical modem device in controller has gotten a C-Bus # already in use for a C-Bus controller.
63	No Globals memory	9	No remote storage; the remote controller has no storage left for requested remote points.
64	Global pnt missing	10	The user address of the remote point was not found in the remote controller.
65	Glob Pnt Occupied	11	A remote output to a remote controller is already assigned to another controller.
66	CPU stopped	12	The remote controller is in stopped condition.
67	CPU not available	13	The remote controller is switched off or does not respond to C-Bus communication.
68	Init. actuators	65	Floating outputs (3-position outputs) are synchronized.
69	WARM START	66	Reason of new start: watchdog.
70	COLD START	67	Reason of new start: power failure, data in RAM destroyed.
71	Point in manual	68	When falling back to password level 3 there are still points in manual override.
72	Report too large	69	Not enough space in the report file for initialization.
73	XI 581 required	70	After a download, an entry is demanded in the initializing phase of the ASPECD application. This can happen only with XI581 emulation.
74	New appli. loaded	74	Download of a new application part or entire application.

Alarm no.	alarm text (English)	cond. code #	cause/reason
75	Auto operation	80	Point is in automatic mode.
76	Manual operation	8	Point is in manual override mode.
77	Too many trend pnt	73	Too many points in trend.
78	No C-BUS refresh	110	No memory to execute refresh / trend functionality.
79	Template too long	85	Template for wildcard search too long.
80		206	Used only for MCR200 controllers. MCR200 rejects the setting of summer time if it is done with corresponding function of XBS or XL-Online.
81		207	Used only for MCR200 controllers. A weekday is allocated to the daily programs of another weekday by copying the corresponding data. While copying, the name of the daily programs (weekday) remains whereas it would be exchanged by allocation.
82		83	Only used for MCR200 controllers. Texts from XIP100 or MCR200 Fax were not able to be loaded into the MCR200.
83	B-Port Download	100	Download was done via B-Port. In addition to this alarm, one of the following alarms is displayed: 88 to 98.
84	C-Bus Download	101	Download was done via C-Bus. In addition to this alarm, one of the following alarms is displayed: 88 to 98.
85	B-Port change	102	Online changes were done via B Port. In addition to this alarm, one of the following alarms is displayed: 88 to 93.
86	C-Bus change	103	Online changes were done via C-Bus. In addition to this alarm, one of the following alarms is displayed: 88 to 93.
87	Device logged	84	Operator has logged himself in with MMI via C-Bus (Remote Login). Not sent on C-bus.
88	DDC Parameter	-	This alarm is shown in addition to one of the following alarms: 83 to 86.
89	DDC Z-Register	-	This alarm is shown in addition to one of the following alarms: 83 to 85.
90	DDC T-Register	-	This alarm is shown in addition to one of the following alarms: 83 to 84.
91	Datapoints	-	This alarm is shown in addition to one of the following alarms: 83 to 86.
92	Time Program	-	This alarm is shown in addition to one of the following alarms: 83 to 86 and 101.
93	ASPECD Program	-	This alarm is shown in addition to one of the following alarms: 83 to 85.
94	Alarm Texts	-	This alarm is shown in addition to one of the following alarms: 83 and 84.
95	Characteristics	-	This alarm is shown in addition to one of the following alarms: 83 and 84.
96	Descriptors	-	This alarm is shown in addition to one of the following alarms: 83 and 84.
97	Engineering Units	-	This alarm is shown in addition to one of the following alarms: 83 and 84.
98	State Texts	-	This alarm is shown in addition to one of the following alarms: 83 and 84.
99	Field I/O	-	This alarm is shown in addition to one of the following alarms: 101.
100	Glob.Pnt.Transfer	-	This alarm is shown in addition to one of the following alarms: 101.
101	Applic. stopped	104 105 106 107	Application task was stopped. This alarm, together with one of the following alarms, is shown: 92, 99, 100, 102.
102	DDC Program	-	This alarm is shown in addition to one of the following alarms: 83 to 86 and 101.
103	I/O board present	108	A module which is part of the required configuration but was missing in the hardware configuration has been added to the hardware configuration again.
104	Time dev. > 2 min	98	A time deviation greater than 2 minutes has been detected on a device on the C-Bus.
105	Manual time sync.	99	Somebody has changed the system time of the C-Bus devices via a local MMI.
106	Dig.Out.Conflict	109	Application error: An XL50 DO is using a triac already in use by a 3-position output.
107	Overr. switch auto	111	Manual override switches on Distributed I/O output modules are reset to automatic mode.
108	Overr. switch manu	112	Manual override switches on Distributed I/O output modules are set into override mode (values coming from the XL controller will be overwritten by the switches).

Alarm no.	alarm text (English)	cond. code #	cause/reason
109	Hardware Failure	88	A Distributed I/O module was removed from the LONWORKS network or a sensor break or a sensor short-circuit or missing NV update from a bound NV was detected on a Distributed I/O module.
110	Hardware OK	89	A missing Distributed I/O module was reconnected to the LONWORKS network or a missing sensor was reconnected on a Distributed I/O module or a sensor break / short-circuit was repaired or a missing NV update from a bound NV was supplied.
111	M-Bus (XL50, only)	-	Used only in Excel 50 fixed applications. Shown together with M-Bus-related alarms.
112	OVFL crit. alarms	113	Critical alarm buffer full.
113	OVFL non-crit. al.	114	Non-critical alarm buffer full.
114	OVFL trend	115	Remote trend buffer full.
115	NV Bindings lost	116	If the network interface has been changed in CARE and the changed application has been downloaded, all bindings will be lost.
116	pls upload trends!	117	The remote trend buffer has reached its notification level and should be uploaded in order to avoid trend buffer overflow.
117	config data def.	118	Configuration data for the remote communication lost or corrupt due to power failure, EEPROM fault or uncharged gold cap.
118	unauthorized acc.	119	Unauthorized telephone number and/or unauthorized password tried to dial in.
119	out of memory	120	No more memory available for alarm handling.
120	Please disconnect!	121	Front-end X is online while remote trend buffer for front-end Y exceeds the notification level. Terminate dial-up connection with the controller in order to allow it to transmit its remote trend buffer to front-end Y.
121	front-end not avail.	122	Front-end could not be reached. Line occupied or disconnected.
122	config complete	123	Configuration for the remote communication received, accepted and complete.
123	modem device OK	124	Response message to the XBS life check.
124	C bus error	125	No C-Bus communication between remote communication device number and application device number. Probably the application device number is missing.
125	LON- I/O init start	126	Initialization start of the Distributed I/O modules.
126	LON- I/O init done	127	Initialization of the Distributed I/O modules finished.
127	IP-DIO conflict	128	Standard I/O module XF5xx plugged with address of already-used DIO module XFL5xx.
128	Invalid user ID	212	CARE license key tag in the application is incorrect.
129	MTO Binding failed	155	The user has tried to make more "many-to-one-bindings" during controller runtime than were specified during CARE engineering. The "many" relation of a "many-to-one-binding" (MTO) is specified during CARE engineering. (The entered "many" relation will be used to calculate the memory space taken from the controller's application memory for the "many-to-one-binding".)
130	board missing	19	In the event of a module defect or power failure (initialization), this alarm is related to the datapoints on this board. The required configuration contains at least one module not included in the hardware configuration.
131	board present	108	In the event of a module defect or power failure (initialization), this alarm is related to the datapoints on this board. A module which is part of the required configuration but was missing in the hardware configuration has been added to the hardware configuration again.

System Alarms Suppression (V. 2.04.xx or higher)

System alarms can be suppressed during CARE engineering by inserting the "at" sign ("@") at the beginning of the corresponding alarm text in the alarm text file. In order to avoid alarm showers at power failure and power return, separate system alarms are provided for module power failure and for input failures on the modules (see Table 21).

Table 21. Avoiding alarm datapoint showers

	Reason for fault	Module alarm	Point alarm
Care 3.x applications for controller firmware V. 2.04.xx	defective module or power failure	"I/O board missing" (54) "I/O board present" (103)	"hardware failure" (109) "hardware OK" (110)
	sensor break / short-circuit or missing NV update from bound NV		"hardware failure" (109) "hardware OK" (110)
Care 4.x applications for controller firmware V. 2.04.xx	defective module or power failure	"I/O board missing" (54) "I/O board present" (103)	"board missing" (130) "board present" (131)
	sensor break / short-circuit or missing NV update from bound NV		"hardware failure" (109) "hardware OK" (110)
Care 4.x applications for controller firmware V. 2.06.xx	defective module or power failure	Due to open LON, module alarms are no longer possible!	"board missing" (130) "board present" (131)
	sensor break / short-circuit or missing NV update from bound NV		"hardware failure" (109) "hardware OK" (110)

Procedure Engineer CARE 4.x applications for controller firmware version 2.04.xx, and then suppress the datapoint system alarms 109 and 110 by placing the @ character at the first position of the corresponding alarm text.

User Program Alarms

It is possible to generate alarm signals at any point in the user program by using a special program command.
The alarm text can be individually created and may contain up to 18 characters.

Data Storage

Each alarm is stored in the alarm memory that can hold up to 99 alarms. Alarm signals in the alarm memory contain neither an indication of the nature of the alarm signals in the alarm (critical/non-critical) nor an acknowledgment of the alarm on the operator interface.

The alarm memory entry contains user address, alarm text, date, and time. If the memory capacity is exceeded, new alarm signals are accepted, such that the last 99 alarms always remain in the alarm memory.

The alarm memory can be viewed on the XI581 (not with XCL5010, Excel 100C), XI582 and XL-Online operator interfaces and the Excel 50 MMI.

Alarms Sent across the System Bus

Alarm recovery Once the capacity of the temporary alarm buffer for system alarms is reached (max. 99 alarms for firmware 2.03.xx or lower, and max. 50 alarms for firmware 2.04.x), then any additional alarms cause the datapoint to be labeled "in alarm" and given a description of the type of alarm that has occurred. Labeling is carried out only for the last occurring alarm for that datapoint.

When a C-bus connection to a front-end has been established, then all alarm messages of the temporary system alarm buffer are sent to the front-end. Afterwards, alarms for datapoints that are labeled "in alarm" are sent directly to the C-bus (except those that are in alarm suppression).

If the controller's alarm history buffer still contains information related to such an alarm, then this information is sent to the front-end. Otherwise, only the alarm type (without data or time) is sent. In this case, the datapoints appear at the front-end with an asterisk indicating that the data and time shown do not correspond to the generation of the alarm.

Refresh list deletion (V1.5.x) If an XBS or XL-Online is disconnected from the bus/controller, then the refresh list is deleted after a period of 2 minutes. This allows point values to be updated that

are set in refresh after a short-time interruption (maximum: 2 minutes) due to a communication error.

TEST MODE (V2.03.X)

General Excel 50/100/500/800 controllers feature a special test mode intended specifically for troubleshooting or system checkout and which allows manually setting outputs and verifying inputs. When entering the test mode, a set of default datapoints is generated corresponding to the physical I/O of the controller. The default user addresses are coded to correspond with the physical I/O in the following way:

AI0101: Analog input, module 1, input 1
 AO0201: Analog output, module 2, output 1
 DI0301: Digital input, module 3, input 1
 DO0401: Digital output, module 4, output 1
 3P0101: Motor output, module 1, output 1

NOTE: Excel 50/100 controllers do not have I/O modules, but their technical addresses follow the same pattern, with module numbers referring to internal I/O boards. For details, see the Excel 50 and Excel 100 Installation Instructions.
 Excel 800 supports the test mode for the Panel Bus I/O Modules, only (XF8xxxx).

Values are displayed (0/1 for digital points) for each of the default datapoints, and the values are refreshed in this screen as they change. Outputs can be set manually via MMI. The alarm buffer records all system alarms and all changes of state of inputs.

Distributed I/O testing (V2.04.xx or higher)

Beginning with controller firmware V2.04.x, Distributed I/O modules can be checked out in the same way as described above. For details, see the Software Release Bulletin for XL500, controller firmware version 2.04.00.

COMMUNICATION

General Control systems often need to carry out complex monitoring and control functions as part of their building management task. This is difficult if individual subsystems cannot exchange data with one another. Control applications using such equipment soon reach the performance limits of their controllers. This is because there is only a limited number of inputs and outputs available and it is difficult for the controller to monitor several processes simultaneously. In addition, it may not be economical to connect different parts of a plant because they are too far away from one another. Equipment that has been specially designed to implement only a particular application has the disadvantages of being more expensive in the first place and inflexible to future needs.

The Excel 50/100/500/600/800 have a modular structure, so they can be tailored to match the plant they are controlling. The individual Excel controllers are able to communicate with one another, so that the configuration of one section of your system does not limit the overall size of your building management system.

LONWORKS communication (V2.04.xx or higher)

Excel 50 and Excel 500 controllers equipped with 3120E5 Neuron chips (date code 0044 or higher) are capable of communicating with devices on an Echelon® LONWORKS® network. For more information, see Excel 50/500 LONWORKS Mechanisms Description, EN0B-0270GE51.

System Bus

Up to 30 Excel controllers can be connected to one another via a System Bus (C-bus). Other C-bus compatible components can be substituted for any of the 30 Excel controllers. Examples of C-bus compatible components are Excel IRC Multi-controllers, the Excel EMC, and Excel Building Supervisors. The C-bus allows con-

trollers and devices to exchange data such as measured values, alarms log, and trends. This means that values from one controller or device can be sent to the entire system.

Besides allowing communication between controllers and devices, the C-bus also enables the entire system to be connected to PC front-ends.

When a controller does not have a modem directly connected, the C-bus also allows controllers to communicate with other controllers that do have a modem connected, so that data can be transmitted via the public telephone network.

Access

The C-bus supports multi-master communication using the token passing procedure. A bus master is a controller governing communication between bus devices. The master asks for data and then distributes the data on the bus. Controllers transmit data only when asked for it by the master or when they assume the function of the master.

Multi-master communication means that all controllers in the system can function as the master, so the right to request and transmit data is not permanently assigned to a specific controller. This has the advantage that a part of the system can still continue working even if one of the controllers is defective.

The flow of data between devices can be structured hierarchically as part of the software in the user program. Structuring data exchange means defining what information can be exchanged between which bus devices. Communication is still carried out on the multi-master principle, but bus access time is reduced by concentrating specific data in specific controllers.

Bus Initialization

When your system first starts up, the software runs a check to see what devices are connected to the C-bus. This process is called initialization. The software stores the information as the Device Type List in the controllers.

During initialization, the bus master requests information about global datapoints from each controller. At the same time, the controllers store the address of the device making the request so that the controllers can subsequently transmit the appropriate data to the appropriate device.

After initialization, each controller knows the address of the next controller with the right to transmit data. If a controller now stops communication, the bus master recognizes that this controller is no longer online and interrupts token passing. As a result, the C-bus reinitializes automatically and also updates the Device Type List, excluding controllers that are no longer online. This ensures continuous bus communication even when individual controllers go off line.

Bus Communication

The Excel 50/100/500/600/800 controller does not transmit any plant-specific data before the C-bus has been initialized. Controller communication depends on the user program stored in each controller. Bus-wide communication occurs when global datapoints have been defined in the user program.

See "Global Datapoints" on page 11 for details on defining global datapoints.

During normal operation, the bus master transmits active values. The bus master transmits only values which have changed or which have been requested by another device on initialization or when a device has been offline.

This method of exchanging data reduces the load on the bus and means controllers store only the data they need for their own communication.

I/O Runtime Synchronization

- XF525** After application download and after a power failure a runtime synchronization takes place which takes the complete runtime as defined in the datapoint description plus an additional 10%.

Calculated Runtime	Actual Runtime
>100%	permanently open
>96%	96% plus 100% of defined runtime (Excel 500)
	96% plus 200% of defined runtime (Excel 50)
<2%	2% minus 100% of defined runtime (Excel 500)
	2% minus 200% of defined runtime (Excel 50)
<0%	permanently closed
Internal hysteresis is 2 to 3.125% and 95 to 96% of defined runtime.	

XF825 Synchronization will take place in the following situations:

Calculated position < Lower sync threshold

The floating actuators will be synchronized when the associated input signal drops below the lower synchronization threshold, which is 2% by default.

In order to avoid any logical interlock problems, this type of synchronization will immediately be finished when the input signal exceeds the lower synchronization threshold + sensitivity hysteresis. The actuator will drive to –“Synchronization Time” in this case.

An additional synchronization with -20 % is done after half an hour and one hour in order to compensate temperature drifts of the valve.

Example:

A cooling valve is closed. The valve is cold at the time it is closed. The valve will get warm and expand. This may result in leakage.

Calculated position > Upper sync threshold

The floating actuators will be synchronized when the associated input signal exceeds the upper synchronization threshold, which is 98% by default.

In order to avoid any logical interlock problems, this type of synchronization will immediately be finished when the input signal drops below upper synchronization threshold – sensitivity hysteresis.

Synchronization after power-up / 24 hours

The floating actuators will be synchronized in the following situations:

- Always after power-up or reset of the Excel 800 controller
- Optionally, once every 24 hours the actuator will be driven towards the “closed” position.

Initialization of Distributed I/O Modules

XF52x V1.02 with Excel 500 V2.01.03

During and after initialization of the Distributed I/O modules, the output of the Remote Override Modules XFR522/XFR522A and XFR524/XFR524A will remain unchanged. This means that the output status will always remain unchanged as long as the 24 Vac power supply is applied and as long as there is no manual change at the XFRxxxx modules.

New Bus Devices

The system automatically detects new devices. When it has detected a new device, the system reinitializes so the new device is included in the Device Type List.

Network-Wide Controller Time Synchronization

Network-wide time synchronization is carried out automatically once each hour by the designated synchronization master. Each controller with firmware V2.0.xx or higher can act as a synchronization master. If the time is manually changed on any of the connected system bus controllers, then this time is adopted for synchronization. If the controller on which the time was changed is eligible as a synchronization master, then it will become the synchronization master on the bus.

Synchronization is based on date, hours, minutes, and seconds to an accuracy of ± 120 seconds across the system bus (detected after no more than 1 hour). If this time is exceeded, an alarm is generated. Daylight saving time is included in the

synchronization process. Any new device added to the system bus will adopt the bus system time.

NOTE: If you enter the time on the local MMI of an older device (prior to V2.0.xx), synchronization will not be carried out. Even the locally entered time might be overwritten by a synchronization coming from a newer device (V2.0.xx or higher).

Point Refreshing

Excel controllers provides a refresh mechanism (that is adapted to the Token timing) for sending the values of the attributes "Value", "Manual Value", "Operating Mode", and "Alarm Status" to either an MMI interface or to a front-end. (A maximum of two point refresh messages can be sent while the controller is holding the Token.)

PC Communication

An Excel 50/100/500/600/800 system can also accommodate a PC connected to the C-bus. Multi-master communication is still supported and token passing continues between the individual bus devices. The C-bus treats controllers as being equal in rank to a PC.

Excel IRC

Excel controllers support communication with the Excel IRC control system. This system monitors and controls individual rooms within a building. The Excel IRC system communicates on the C-bus via its Multicontroller (MC). The Application control functions for Excel IRC, called ACFs, are all processed by the MC. See EXCEL 5000 IRC Integration System Overview and Application Guide, EN3R-1182GE51, for additional information.

Remote Communication

Excel 50/100/500/600/800 controllers are all able to communicate to remote building supervisors via an analog or ISDN modem connected to them. This allows two-way communication between the building supervisors and the controllers. The Excel 100/500 controllers can store the numbers and passwords for up to three supervisors and can call them in response to critical alarms or other programmed triggers, or the supervisor can call at any time for status, trend, or alarm information.

Disable dial-out (V2.04.xx or higher)

Automatic upload of the remote trend buffer can be disabled by a remote front-end (XBS 1.6.0 or higher). In this case, remote trend values are stored in the buffer, with newest values overwriting oldest when the buffer is full, but the controller does not dial out to send remote trend buffer level alarms or to flush the buffer. The controller will still dial out for critical and uncritical alarms.

Excel 100 and 600 controllers and Excel 500 controllers with V1.5.xx firmware or earlier can, when operating as stand-alone controllers, make use of the XDM506 modem submodule mounted on the CPU board. The XDM506 can perform all of the functions of the XM100A in providing remote communication capability with up to three building supervisors.

Direct modem connection (Excel 50/500, V2.01.xx or higher and Excel 800, V3.00.xx or higher)

Excel 50/500 controllers with firmware version V2.01.xx or higher, Excel 100C controllers, as well as Excel 800 controllers with firmware version V3.00.xx or higher have the advantage of allowing direct connection of a modem or ISDN terminal

adapter to the controller for either C-Bus systems or stand-alone controller applications. No additional hardware is necessary. Excel 50/100/500/800 controllers can store 100 trend values (by default) for the connected EBI/SymmetrE, in addition to handling normal building control functions. Data transmission rates up to 38.4 Kbaud are supported with modem/ISDN terminal adapter attached. If no special modem behavior is needed, it is not necessary to set up or initialize the modem/ISDN terminal adapter. The Excel 50/100/500/800 controller will detect the modem attached to the serial port and set the communication speed to the default value of 9.6 Kbaud. The Excel 50/100/500/800 controller will also detect whether the modem/ISDN terminal adapter is initialized in auto-answer or manu-answer mode, and it will initialize the modem for manu-answer mode (S0=0).

NOTE: Remote communication to XBSi building supervisors is not supported by direct modem connection.

NOTE: IRC alarming can be accomplished only indirectly with firmware version V2.01.xx by using a separate Excel 500 controller with special operating system firmware (XL IRC V1.03.x) which allows mapping between it and an IRC Multicontroller. In that case, the IRC alarms are treated like normal C-Bus data.

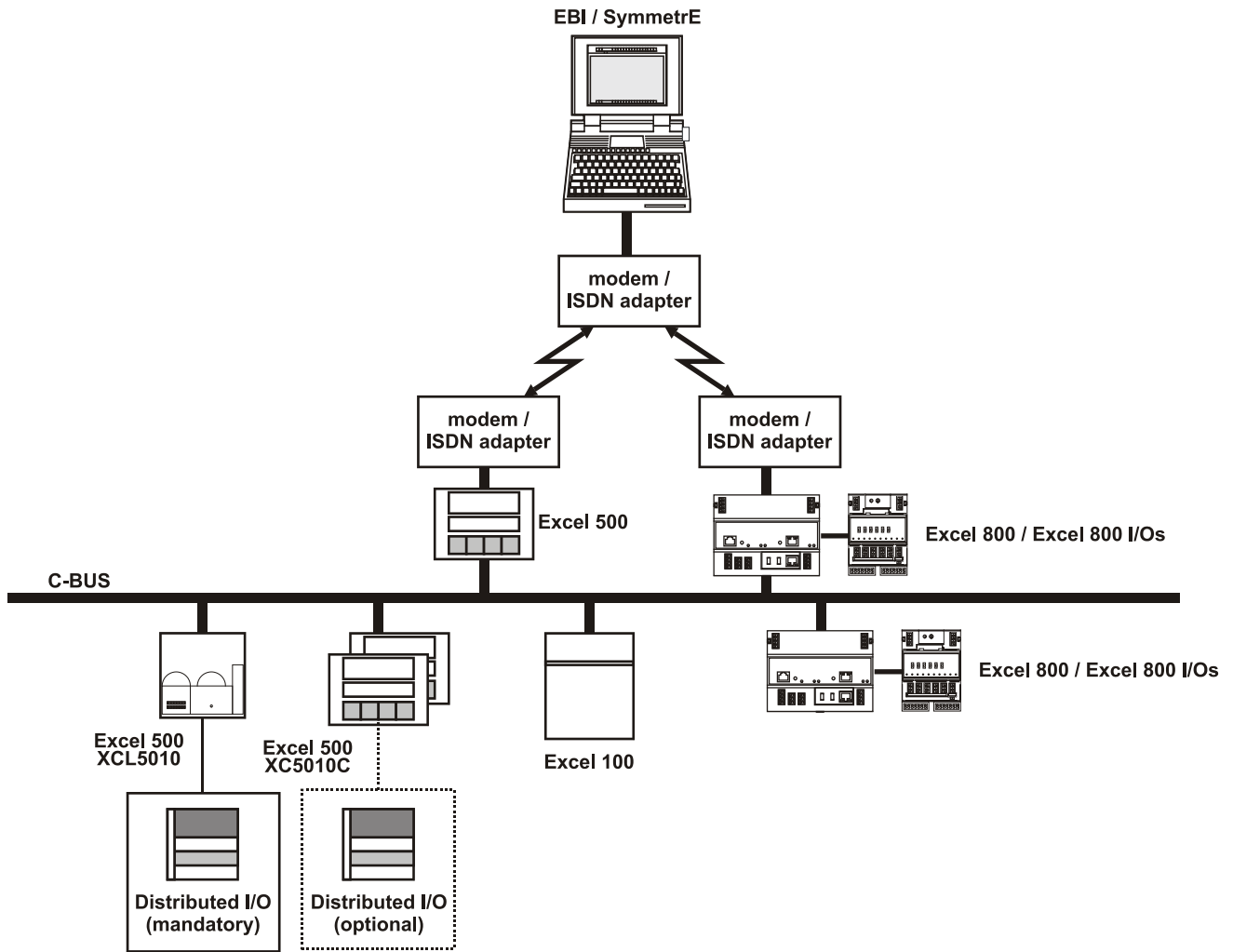


Fig. 23. Remote Modem Connection

Remote Trending (dial-up)

General

Per front-end (XBS, EBI), trend values for a total of 20 data points can be stored (via dial-up) in the remote trend buffer of the controller to which the modem has been connected. These 20 data points can come from the controller to which the modem has been connected, or they can come from various other controllers on the same C-Bus or LONWORKS bus.

Controller Firmware 2.03.xx and Higher

Per front-end (XBS, EBI), trend values for a total of 100 data points can be stored (via dial-up) in the remote trend buffer of the controller to which the modem has been connected. These 100 data points can come from the controller to which the modem has been connected, or they can come from various other controllers on the same C-Bus or LONWORKS bus. Unused application memory can be used as additional remote trend buffer.

Controller Firmware 2.04.xx and Higher

In combination with the large RAM controllers XD52-FC, XD52-FCS, XC5210C, a total of 384 KB of additional trend buffer is available. This increase in the trend buffer size reduces the number of times the controller must dial-up the front-end and lowers the risk of trend values being overwritten due to a full buffer. By exploiting this feature, it is possible, when no application is downloaded, to use the EXCEL controller as a pure trending device. The amount of additional memory available for the remote trend buffer is determined by the value for "Application Memory Size" entered with the MMI during the start-up sequence of the controller. This number is subtracted from the total application memory, and the resulting number, in Kbytes, is the additional remote trend buffer size. Fig. 24 illustrates the adjustable remote trend buffer.

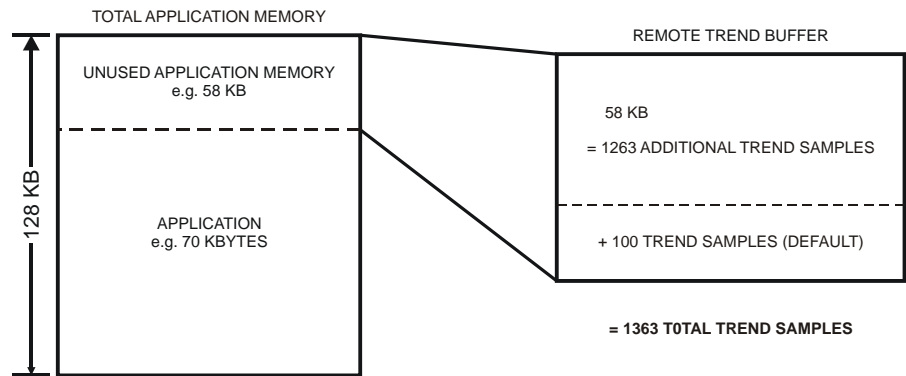


Fig. 24. Adjustable remote trend buffer example

The maximum number of trend values will be displayed on the MMI once a value for application memory size is entered. The adjustment range for the application memory size is the following:

Table 22. Adjustment range for application memory size

application memory size	trend values in remote trend buffer
maximum (default): 128 Kbyte	42 per front-end
example: 120 Kbyte	100 per front-end
minimum: 38 Kbyte	100 per front-end; PLUS "N" for front-end A

Remote trend buffer size formula

For XD52-FC, XD52-FCS, and XC5210C controller (512 Kbytes of RAM):
 $N = (128 \text{ Kbytes} - \text{appl. size (in Kbytes)} + 384 \text{ Kbytes}) * 1024 \text{ bytes} / 47 \text{ bytes}$

For all other controllers equipped with Flash EPROMS:

$N = (128 \text{ Kbytes} - \text{appl. size (in Kbytes)}) * 1024 \text{ bytes} / 47 \text{ bytes}$
 Hence, the maximum value of N is 10,327 trend values for large RAM controllers and 1,960 trend values for all others containing Flash memory. This means that for all Flash memory-equipped modules with a minimum application size of 38 Kbytes, there will be 2,064 (1,960 + 104) trend values for front-end A and 104 trend values each for front-end B and front-end C.
 If an application being downloaded exceeds the application memory size, a warning message will be displayed on the MMI, and the download will not be executed.

Excel 800

Excel 800 controllers provide a reserved Remote Trend Memory of 60Kbytes, which allows a total of 2591 trend entries to be stored – see also diagram below:
 2391 trend entries for front-end A
 Plus 100 trend entries for front-end B
 Plus 100 trend entries for front-end C

 TOTAL = 2591 trend entries

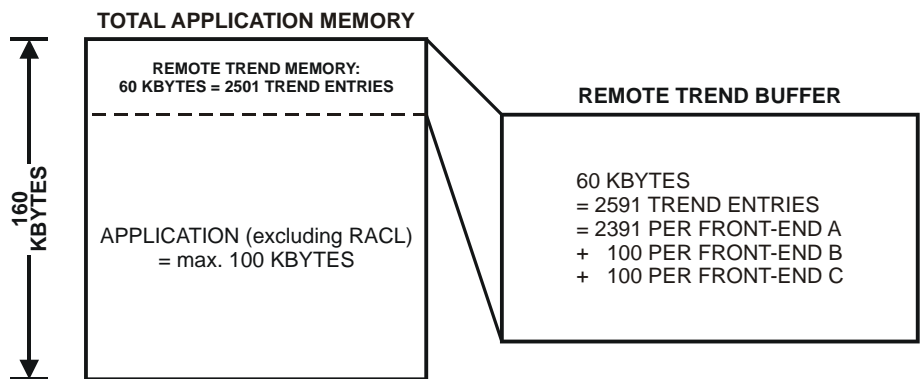


Fig. 25. Adjustable remote trend buffer example (Excel 800)

Unused application memory can be used for storing additional remote trend entries. In order to do so, the adjustment range for the application memory size is the following.

Table 23. Adjustment range of application memory size

application memory size	trend values in remote trend buffer
maximum (default): 100 Kbyte	2501
example: 80 Kbyte	2936
minimum: 38 Kbyte	3851

MODEMFAQ

Detailed information and guidance can be obtained from the MODEMFAQ document, which can be found on the following servers:

http://web.ge51.honeywell.de/dep/mc/HVAC_Products/Automation_and_Control/CentralPlantControls/Modem-Interface/MODMFAQ4.DOC

MISCELLEANOUS

Customize Windows Default Regional and Language Settings

In order to setup an Excel 5000 system that uses any language other than the respective Windows default language, you must customize the Regional and Language Options Settings in Windows as a prerequisite before working with CARE / COACH and Excel Online / COACH Online. In addition, for a successful application engineering, the controller must be equipped with the appropriate firmware and XI582 with the appropriate EPROM.

For all settings to be done, please refer to the country and language settings table that lists the settings for:

- Windows
- CARE / COACH
- Excel Online / COACH Online
- XI852 EPROM
- Controller firmware

For information on coding special characters in Western, Eastern and Turkish languages, please refer to the character settings tables following the country and language settings table.

To customize Windows, refer to the procedure following the character settings tables.

Table 24. HBS Country and Language Settings

Country	Windows Version / Regional and Language Options Settings	CARE Country Code / Location Selection	Controllers with Internal Text MMI		Controllers with Internal Graphic MMI	Controllers with External XI581/2	XL Online
			XL 40	XL 50	XL 50	XL100/500/800	
			XL40A2MMI XI40AI (required firmware)	XL50- MMI-xxxx XL50D XL50A-MMI-xxxx XL50A-UMMI-xxxx (required firmware)	XL50CH XL50CY XL50TW XL50ACH XL50ACY XL50ATW (required firmware)	XI581/2 XI581B/2B (required hardware)	
Several	Arabic	Arabic (not supported)	not supported	not supported	not supported	not supported	not supported
Australia	English (Australia)	Australia	XL50L207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Albania	Albanian	not supported	not supported	not supported	not supported	not supported	Western
Austria	German (Austria)	Austria	XL50L207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Belgium	Dutch (Belgium), French (Belgium)	Belgium	XL50L207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Bulgaria	Bulgarian	Russia	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Cyrillic
Brazil	Portuguese (Brazil)	Brazil	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Western
Canada	English (Canada)	Canada	XL50L207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
China	Chinese (Simplified)	PR China	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU XI581B/2B-CH	CHINESE_ BIG5

Country	Windows Version / Regional and Language Options Settings	CARE Country Code / Location Selection	Controllers with Internal Text MMI		Controllers with Internal Graphic MMI	Controllers with External XI581/2	XL Online
			XL 40	XL 50	XL 50	XL100/500/800	
			XL40A2MMI XI40AI (required firmware)	XL50- MMI-xxxx XL50D XL50A-MMI-xxxx XL50A-UMMI-xxxx (required firmware)	XL50CH XL50CY XL50TW XL50ACH XL50ACY XL50ATW (required firmware)	XI581/2 XI581B/2B (required hardware)	
Croatia	Croatian	Slovakia	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Central European
Czech Republic	Czech	Slovakia	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Central European
Denmark	Danish	Denmark	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Western
Finland	Finnish	Finland	XL50L207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
France	French	France	XL50L207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Germany	German	Germany	XL50L207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Several	Hebrew	Hebrew	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Western
Hungary	Hungarian	Hungary	XL50L207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Central European
Iceland	Icelandic	Iceland	XL50L207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Ireland	English (Ireland)	Ireland	XL50L207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Italy	Italian	Italy	XL50L207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Japan	Japanese	Japan	not supported	not supported	not supported	XI581B/2B-JP	Japanese
Korea	Korean	Korea	not supported	not supported	not supported	not supported	Western
Several	Several	Latin America	XL50L207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Lithuania	Lithuanian	not supported	not supported	not supported	not supported	not supported	Cyrillic
Macedonia	Macedonian	Russia	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Cyrillic
Mexico	Spanish (Mexico)	Mexico	XL50L207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Morocco	French	France	XL50L207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Nether- lands	Dutch	Netherlands	XL50L207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
New Zealand	English (New Zealand)	New Zealand	XL50L207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Norway	Norwegian	Norway	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Western
Poland	Polish	Slovakia	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Central European
Portugal	Portuguese	Portugal	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Western

Country	Windows Version / Regional and Language Options Settings	CARE Country Code / Location Selection	Controllers with Internal Text MMI		Controllers with Internal Graphic MMI	Controllers with External XI581/2	XL Online
			XL 40	XL 50	XL 50	XL100/500/800	
			XL40A2MMI XI40AI (required firmware)	XL50- MMI-xxxx XL50D XL50A-MMI-xxxx XL50A-UMMI-xxxx (required firmware)	XL50CH XL50CY XL50TW XL50ACH XL50ACY XL50ATW (required firmware)	XI581/2 XI581B/2B (required hardware)	
Romania	Romanian	Slovakia	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Central European
Russia	Russian	Russia	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Cyrillic
Serbia	Serbian (Latin, Bosnia and Herzegovina)	not supported	not supported	not supported	not supported	not supported	Cyrillic
Slovakia	Slovak	Slovakia	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Central European
Slovenia	Slovenian	Slovakia	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Central European
Spain	Spanish	Spain	XL50L207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Sweden	Swedish	Sweden	XL50L207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Switzerland	German (Switzerland), French (Switzerland), Italian (Switzerland)	Switzerland	XL50L207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Taiwan	Chinese (Taiwan)	Taiwan	not supported	not supported	TW50L207.02C or higher	XI581B/2B-TW	Thai
Tunisia	French	France	XL50L207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Turkey	Turkish	Turkey	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Turkish
U.A.E.	Arabic (U.A.E.)	Arabic (not supported)	not supported	not supported	not supported	not supported	not supported
Ukraine	Ukrainian	Russia	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Cyrillic
United Kingdom	English (United Kingdom)	United Kingdom	XL50L207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
United States	English	United States	XL50L207.02C or higher	EU50L207.02C or higher TW50L207.02C or higher XL50L207.02C or higher	EU50L207.02C or higher TW50L207.02C or higher XL50L207.02C or higher	XI581B/2B-EU XI581B/2B-TW XI581B/2B-CH XI581B/2B-JP XI581B/2B-CY	Western

Table 25. CentralLine Country and Language Settings

Country	Windows Version / Regional and Language Options Settings	COACH Country Selection	Controllers with Internal Text MMI		Controllers with Internal Graphic MMI	Controllers with External CLMMI00N2x	COACH Online
			Tiger	Panther	Panther	Lion	
			CLTG38L11 CLTG00MMI (required firmware)	CLPA13LC1x CLPA13LM1x CLPA21CM1x CLPA21LC1x CLPA21LM1x (required firmware)	CLPA13LC2x CLPA13LM2x CLPA21LC2x CLPA21LM2x (required firmware)	CLMMI00N2x (required hardware)	
Several	Arabic	not supported	not supported	not supported	not supported	not supported	not supported
Australia	English (Australia)	Australia	XL50L207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Albania	Albanian	Albanian	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Western
Austria	German (Austria)	Austria	XL50L207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Belgium	Dutch (Belgium), French (Belgium)	Belgium	XL50L207.02C or or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Bulgaria	Bulgarian	Bulgaria	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Cyrillic
Brazil	Portuguese (Brazil)	not supported	not supported	not supported	not supported	not supported	not supported
Canada	English (Canada)	not supported	not supported	not supported	not supported	not supported	not supported
China	Chinese (Simplified)	not supported	not supported	not supported	not supported	not supported	not supported
Croatia	Croatian	Croatia	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Central European
Czech Republic	Czech	Czech Republic	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Central European
Denmark	Danish	Denmark	XL50L207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Finland	Finnish	Finland	XL50L207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
France	French	France	XL50L207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Germany	German	Germany	XL50L207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Several	Hebrew	as desired	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Western
Hungary	Hungarian	Hungary	XL50L207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Central European
Iceland	Icelandic	Iceland	XL50L207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Ireland	English (Ireland)	United Kingdom	XL50L207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Italy	Italian	Italy	XL50L207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Japan	Japanese	not supported	not supported	not supported	not supported	not supported	not supported
Korea	Korean	not supported	not supported	not supported	not supported	not supported	not supported
Lithuania	Lithuanian	Lithuania	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Cyrillic

Country	Windows Version / Regional and Language Options Settings	COACH Country Selection	Controllers with Internal Text MMI		Controllers with Internal Graphic MMI	Controllers with External CLMMI00N2x	COACH Online
			Tiger	Panther	Panther	Lion	
			CLTG38L11 CLTG00MMI (required firmware)	CLPA13LC1x CLPA13LM1x CLPA21CM1x CLPA21LC1x CLPA21LM1x (required firmware)	CLPA13LC2x CLPA13LM2x CLPA21LC2x CLPA21LM2x (required firmware)	CLMMI00N2x (required hardware)	
Macedonia	Macedonian	Macedonia	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Cyrillic
Mexico	Spanish (Mexico)	not supported	not supported	not supported	not supported	not supported	not supported
Morocco	French	Morocco	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Western
Nether- lands	Dutch	Netherlands	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Western
New Zealand	English (New Zealand)	not supported	not supported	not supported	not supported	not supported	not supported
Norway	Norwegian	Norway	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Western
Poland	Polish	Poland	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Central European
Portugal	Portuguese	Portugal	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Western
Romania	Romanian	Romania	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Central European
Russia	Russian	Russia	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Cyrillic
Serbia	Serbian (Latin, Bosnia and Herzegovina)	Serbia	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Cyrillic
Slovakia	Slovak	Slovakia	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Central European
Slovenia	Slovenian	Slovenia	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Central European
Spain	Spanish	Spain	XL50L207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Sweden	Swedish	Sweden	XL50L207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Switzerland	German (Switzerland), French (Switzerland), Italian (Switzerland)	Switzerland France not supported	XL50L207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Taiwan	Chinese (Taiwan)	not supported	not supported	not supported	not supported	not supported	not supported
Tunisia	French	Tunisia	XL50L207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Turkey	Turkish	Turkey	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Turkish
U.A.E.	Arabic (U.A.E.)	U.A.E. (not supported)	not supported	not supported	not supported	not supported	not supported
Ukraine	Ukrainian	Ukraine	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Cyrillic
United Kingdom	English (United Kingdom)	United Kingdom	XL50L207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western

Country	Windows Version / Regional and Language Options Settings	COACH Country Selection	Controllers with Internal Text MMI		Controllers with Internal Graphic MMI	Controllers with External CLMMI00N2x	COACH Online
			Tiger	Panther	Panther	Lion	
			CLTG38L11 CLTG00MMI (required firmware)	CLPA13LC1x CLPA13LM1x CLPA21CM1x CLPA21LC1x CLPA21LM1x (required firmware)	CLPA13LC2x CLPA13LM2x CLPA21LC2x CLPA21LM2x (required firmware)	CLMMI00N2x (required hardware)	
United States	English	United Kingdom	XL50L207.02C or higher	EU50L207.02C or higher TW50L207.02C or higher XL50L207.02C or higher	EU50L207.02C or higher TW50L207.02C or higher XL50L207.02C	EU50L207.02C or higher TW50L207.02C or higher XL50L207.02C	Western

Table 26. Character Settings (Western Europe)

Hex	Dec	Char	Unicode	ISO/IEC 10646-1:2000 Character Name
20	32		32	SPACE
23	35	#	35	NUMBER SIGN
24	36	\$	36	DOLLAR SIGN
25	37	%	37	PERCENT SIGN
26	38	&	38	AMPERSAND
27	39	'	39	APOSTROPHE
28	40	(	40	LEFT PARENTHESIS
29	41	)	41	RIGHT PARENTHESIS
2E	46	.	46	FULL STOP
30	48	0	48	DIGIT ZERO
31	49	1	49	DIGIT ONE
32	50	2	50	DIGIT TWO
33	51	3	51	DIGIT THREE
34	52	4	52	DIGIT FOUR
35	53	5	53	DIGIT FIVE
36	54	6	54	DIGIT SIX
37	55	7	55	DIGIT SEVEN
38	56	8	56	DIGIT EIGHT
39	57	9	57	DIGIT NINE
3A	58	:	58	COLON
40	64	@	64	COMMERCIAL AT
41	65	A	65	LATIN CAPITAL LETTER A
42	66	B	66	LATIN CAPITAL LETTER B

Hex	Dec	Char	Unicode	ISO/IEC 10646-1:2000 Character Name
43	67	C	67	LATIN CAPITAL LETTER C
44	68	D	68	LATIN CAPITAL LETTER D
45	69	E	69	LATIN CAPITAL LETTER E
46	70	F	70	LATIN CAPITAL LETTER F
47	71	G	71	LATIN CAPITAL LETTER G
48	72	H	72	LATIN CAPITAL LETTER H
49	73	I	73	LATIN CAPITAL LETTER I
4A	74	J	74	LATIN CAPITAL LETTER J
4B	75	K	75	LATIN CAPITAL LETTER K
4C	76	L	76	LATIN CAPITAL LETTER L
4D	77	M	77	LATIN CAPITAL LETTER M
4E	78	N	78	LATIN CAPITAL LETTER N
4F	79	O	79	LATIN CAPITAL LETTER O
50	80	P	80	LATIN CAPITAL LETTER P
51	81	Q	81	LATIN CAPITAL LETTER Q
52	82	R	82	LATIN CAPITAL LETTER R
53	83	S	83	LATIN CAPITAL LETTER S
54	84	T	84	LATIN CAPITAL LETTER T
55	85	U	85	LATIN CAPITAL LETTER U
56	86	V	86	LATIN CAPITAL LETTER V
57	87	W	87	LATIN CAPITAL LETTER W
58	88	X	88	LATIN CAPITAL LETTER X
59	89	Y	89	LATIN CAPITAL LETTER Y
5A	90	Z	90	LATIN CAPITAL LETTER Z
5F	95	_	95	LOW LINE
61	97	a	97	LATIN SMALL LETTER A
62	98	b	98	LATIN SMALL LETTER B
63	99	c	99	LATIN SMALL LETTER C
64	100	d	100	LATIN SMALL LETTER D
65	101	e	101	LATIN SMALL LETTER E
66	102	f	102	LATIN SMALL LETTER F
67	103	g	103	LATIN SMALL LETTER G
68	104	h	104	LATIN SMALL LETTER H
69	105	i	105	LATIN SMALL LETTER I
6A	106	j	106	LATIN SMALL LETTER J
6B	107	k	107	LATIN SMALL LETTER K

Hex	Dec	Char	Unicode	ISO/IEC 10646-1:2000 Character Name
6C	108	l	108	LATIN SMALL LETTER L
6D	109	m	109	LATIN SMALL LETTER M
6E	110	n	110	LATIN SMALL LETTER N
6F	111	o	111	LATIN SMALL LETTER O
70	112	p	112	LATIN SMALL LETTER P
71	113	q	113	LATIN SMALL LETTER Q
72	114	r	114	LATIN SMALL LETTER R
73	115	s	115	LATIN SMALL LETTER S
74	116	t	116	LATIN SMALL LETTER T
75	117	u	117	LATIN SMALL LETTER U
76	118	v	118	LATIN SMALL LETTER V
77	119	w	119	LATIN SMALL LETTER W
78	120	x	120	LATIN SMALL LETTER X
79	121	y	121	LATIN SMALL LETTER Y
7A	122	z	122	LATIN SMALL LETTER Z
7E	126	~	126	TILDE
80	128	Ç	199	LATIN CAPITAL LETTER C WITH CEDILLA
81	129	ü	252	LATIN SMALL LETTER U WITH DIAERESIS
82	130	é	233	LATIN SMALL LETTER E WITH ACUTE
83	131	â	226	LATIN SMALL LETTER A WITH CIRCUMFLEX
84	132	ä	228	LATIN SMALL LETTER A WITH DIAERESIS
85	133	à	224	LATIN SMALL LETTER A WITH GRAVE
86	134	å	229	LATIN SMALL LETTER A WITH RING ABOVE
87	135	ç	231	LATIN SMALL LETTER C WITH CEDILLA
88	136	ê	234	LATIN SMALL LETTER E WITH CIRCUMFLEX
89	137	ë	235	LATIN SMALL LETTER E WITH DIAERESIS
8A	138	è	232	LATIN SMALL LETTER E WITH GRAVE
8B	139	ï	239	LATIN SMALL LETTER I WITH DIAERESIS
8C	140	î	238	LATIN SMALL LETTER I WITH CIRCUMFLEX
8D	141	ì	236	LATIN SMALL LETTER I WITH GRAVE
8E	142	Ä	196	LATIN CAPITAL LETTER A WITH DIAERESIS
8F	143	Å	197	LATIN CAPITAL LETTER A WITH RING ABOVE
90	144	É	201	LATIN CAPITAL LETTER E WITH ACUTE
91	145	æ	230	LATIN SMALL LETTER AE
92	146	Æ	198	LATIN CAPITAL LETTER AE
93	147	ô	244	LATIN SMALL LETTER O WITH CIRCUMFLEX

Hex	Dec	Char	Unicode	ISO/IEC 10646-1:2000 Character Name
94	148	ö	246	LATIN SMALL LETTER O WITH DIAERESIS
95	149	ò	242	LATIN SMALL LETTER O WITH GRAVE
96	150	û	251	LATIN SMALL LETTER U WITH CIRCUMFLEX
97	151	ù	249	LATIN SMALL LETTER U WITH GRAVE
98	152	ÿ	255	LATIN SMALL LETTER Y WITH DIAERESIS
99	153	Ö	214	LATIN CAPITAL LETTER O WITH DIAERESIS
9A	154	Ü	220	LATIN CAPITAL LETTER U WITH DIAERESIS
9B	155	ø	248	LATIN SMALL LETTER O WITH STROKE
9D	157	Ø	216	LATIN CAPITAL LETTER O WITH STROKE
9F	159	f	402	LATIN SMALL LETTER F WITH HOOK
A0	160	á	225	LATIN SMALL LETTER A WITH ACUTE
A1	161	í	237	LATIN SMALL LETTER I WITH ACUTE
A2	162	ó	243	LATIN SMALL LETTER O WITH ACUTE
A3	163	ú	250	LATIN SMALL LETTER U WITH ACUTE
A4	164	ñ	241	LATIN SMALL LETTER N WITH TILDE
A5	165	Ñ	209	LATIN CAPITAL LETTER N WITH TILDE
A8	168	¿	191	INVERTED QUESTION MARK
B5	181	Á	193	LATIN CAPITAL LETTER A WITH ACUTE
B6	182	Â	194	LATIN CAPITAL LETTER A WITH CIRCUMFLEX
B7	183	À	192	LATIN CAPITAL LETTER A WITH GRAVE
C6	198	ã	227	LATIN SMALL LETTER A WITH TILDE
C7	199	Ã	195	LATIN CAPITAL LETTER A WITH TILDE
D0	208	ð	240	LATIN SMALL LETTER ETH
D1	209	Ð	208	LATIN CAPITAL LETTER ETH
D2	210	Ê	202	LATIN CAPITAL LETTER E WITH CIRCUMFLEX
D3	211	Ë	203	LATIN CAPITAL LETTER E WITH DIAERESIS
D4	212	È	200	LATIN CAPITAL LETTER E WITH GRAVE
D5	213	ı	305	LATIN SMALL LETTER DOTLESS I
D6	214	Í	205	LATIN CAPITAL LETTER I WITH ACUTE
D7	215	Î	206	LATIN CAPITAL LETTER I WITH CIRCUMFLEX
D8	216	Ï	207	LATIN CAPITAL LETTER I WITH DIAERESIS
DE	222	Ì	204	LATIN CAPITAL LETTER I WITH GRAVE
E0	224	Ó	211	LATIN CAPITAL LETTER O WITH ACUTE
E1	225	ß	223	LATIN SMALL LETTER SHARP S
E2	226	Ô	212	LATIN CAPITAL LETTER O WITH CIRCUMFLEX
E3	227	Ò	210	LATIN CAPITAL LETTER O WITH GRAVE

Hex	Dec	Char	Unicode	ISO/IEC 10646-1:2000 Character Name
E4	228	ō	245	LATIN SMALL LETTER O WITH TILDE
E5	229	Õ	213	LATIN CAPITAL LETTER O WITH TILDE
E6	230	μ	181	MICRO SIGN
E7	231	þ	254	LATIN SMALL LETTER THORN
E8	232	Ɔ	222	LATIN CAPITAL LETTER THORN
E9	233	Ú	218	LATIN CAPITAL LETTER U WITH ACUTE
EA	234	Û	219	LATIN CAPITAL LETTER U WITH CIRCUMFLEX
EB	235	Û	217	LATIN CAPITAL LETTER U WITH GRAVE
EC	236	ý	253	LATIN SMALL LETTER Y WITH ACUTE
ED	237	Ý	221	LATIN CAPITAL LETTER Y WITH ACUTE
EF	239	´	180	ACUTE ACCENT
F8	248	°	176	DEGREE SIGN

Table 27. Character Settings (Eastern Europe)

Hex	Dec	Char	Unicode	ISO/IEC 10646-1:2000 Character Name
20	32		32	SPACE
23	35	#	35	NUMBER SIGN
24	36	\$	36	DOLLAR SIGN
25	37	%	37	PERCENT SIGN
26	38	&	38	AMPERSAND
27	39	'	39	APOSTROPHE
28	40	(	40	LEFT PARENTHESIS
29	41	)	41	RIGHT PARENTHESIS
2E	46	.	46	FULL STOP
30	48	0	48	DIGIT ZERO
31	49	1	49	DIGIT ONE
32	50	2	50	DIGIT TWO
33	51	3	51	DIGIT THREE
34	52	4	52	DIGIT FOUR
35	53	5	53	DIGIT FIVE
36	54	6	54	DIGIT SIX
37	55	7	55	DIGIT SEVEN
38	56	8	56	DIGIT EIGHT
39	57	9	57	DIGIT NINE
3A	58	:	58	COLON

Hex	Dec	Char	Unicode	ISO/IEC 10646-1:2000 Character Name
40	64	@	64	COMMERCIAL AT
41	65	A	65	LATIN CAPITAL LETTER A
42	66	B	66	LATIN CAPITAL LETTER B
43	67	C	67	LATIN CAPITAL LETTER C
44	68	D	68	LATIN CAPITAL LETTER D
45	69	E	69	LATIN CAPITAL LETTER E
46	70	F	70	LATIN CAPITAL LETTER F
47	71	G	71	LATIN CAPITAL LETTER G
48	72	H	72	LATIN CAPITAL LETTER H
49	73	I	73	LATIN CAPITAL LETTER I
4A	74	J	74	LATIN CAPITAL LETTER J
4B	75	K	75	LATIN CAPITAL LETTER K
4C	76	L	76	LATIN CAPITAL LETTER L
4D	77	M	77	LATIN CAPITAL LETTER M
4E	78	N	78	LATIN CAPITAL LETTER N
4F	79	O	79	LATIN CAPITAL LETTER O
50	80	P	80	LATIN CAPITAL LETTER P
51	81	Q	81	LATIN CAPITAL LETTER Q
52	82	R	82	LATIN CAPITAL LETTER R
53	83	S	83	LATIN CAPITAL LETTER S
54	84	T	84	LATIN CAPITAL LETTER T
55	85	U	85	LATIN CAPITAL LETTER U
56	86	V	86	LATIN CAPITAL LETTER V
57	87	W	87	LATIN CAPITAL LETTER W
58	88	X	88	LATIN CAPITAL LETTER X
59	89	Y	89	LATIN CAPITAL LETTER Y
5A	90	Z	90	LATIN CAPITAL LETTER Z
5F	95	_	95	LOW LINE
61	97	a	97	LATIN SMALL LETTER A
62	98	b	98	LATIN SMALL LETTER B
63	99	c	99	LATIN SMALL LETTER C
64	100	d	100	LATIN SMALL LETTER D
65	101	e	101	LATIN SMALL LETTER E
66	102	f	102	LATIN SMALL LETTER F
67	103	g	103	LATIN SMALL LETTER G
68	104	h	104	LATIN SMALL LETTER H

Hex	Dec	Char	Unicode	ISO/IEC 10646-1:2000 Character Name
69	105	i	105	LATIN SMALL LETTER I
6A	106	j	106	LATIN SMALL LETTER J
6B	107	k	107	LATIN SMALL LETTER K
6C	108	l	108	LATIN SMALL LETTER L
6D	109	m	109	LATIN SMALL LETTER M
6E	110	n	110	LATIN SMALL LETTER N
6F	111	o	111	LATIN SMALL LETTER O
70	112	p	112	LATIN SMALL LETTER P
71	113	q	113	LATIN SMALL LETTER Q
72	114	r	114	LATIN SMALL LETTER R
73	115	s	115	LATIN SMALL LETTER S
74	116	t	116	LATIN SMALL LETTER T
75	117	u	117	LATIN SMALL LETTER U
76	118	v	118	LATIN SMALL LETTER V
77	119	w	119	LATIN SMALL LETTER W
78	120	x	120	LATIN SMALL LETTER X
79	121	y	121	LATIN SMALL LETTER Y
7A	122	z	122	LATIN SMALL LETTER Z
7E	126	~	126	TILDE
80	128	Ç	199	LATIN CAPITAL LETTER C WITH CEDILLA
81	129	ü	252	LATIN SMALL LETTER U WITH DIAERESIS
82	130	é	233	LATIN SMALL LETTER E WITH ACUTE
83	131	â	226	LATIN SMALL LETTER A WITH CIRCUMFLEX
84	132	ä	228	LATIN SMALL LETTER A WITH DIAERESIS
85	133	û	367	LATIN SMALL LETTER U WITH RING ABOVE
86	134	ć	263	LATIN SMALL LETTER C WITH ACUTE
87	135	ç	231	LATIN SMALL LETTER C WITH CEDILLA
88	136	ł	322	LATIN SMALL LETTER L WITH STROKE
89	137	ë	235	LATIN SMALL LETTER E WITH DIAERESIS
8A	138	Ő	336	LATIN CAPITAL LETTER O WITH DOUBLE ACUTE
8B	139	ó	337	LATIN SMALL LETTER O WITH DOUBLE ACUTE
8C	140	î	238	LATIN SMALL LETTER I WITH CIRCUMFLEX
8D	141	Ž	377	LATIN CAPITAL LETTER Z WITH ACUTE
8E	142	Ä	196	LATIN CAPITAL LETTER A WITH DIAERESIS
8F	143	Ć	262	LATIN CAPITAL LETTER C WITH ACUTE

Hex	Dec	Char	Unicode	ISO/IEC 10646-1:2000 Character Name
90	144	É	201	LATIN CAPITAL LETTER E WITH ACUTE
91	145	Í	313	LATIN CAPITAL LETTER L WITH ACUTE
92	146	í	314	LATIN SMALL LETTER L WITH ACUTE
93	147	ô	244	LATIN SMALL LETTER O WITH CIRCUMFLEX
94	148	ö	246	LATIN SMALL LETTER O WITH DIAERESIS
95	149	Ĺ	317	LATIN CAPITAL LETTER L WITH CARON
96	150	ĺ	318	LATIN SMALL LETTER L WITH CARON
97	151	Ś	346	LATIN CAPITAL LETTER S WITH ACUTE
98	152	ś	347	LATIN SMALL LETTER S WITH ACUTE
99	153	Ö	214	LATIN CAPITAL LETTER O WITH DIAERESIS
9A	154	Ü	220	LATIN CAPITAL LETTER U WITH DIAERESIS
9B	155	Ť	356	LATIN CAPITAL LETTER T WITH CARON
9C	156	ť	357	LATIN SMALL LETTER T WITH CARON
9D	157	Ł	321	LATIN CAPITAL LETTER L WITH STROKE
9F	159	č	269	LATIN SMALL LETTER C WITH CARON
A0	160	á	225	LATIN SMALL LETTER A WITH ACUTE
A1	161	í	237	LATIN SMALL LETTER I WITH ACUTE
A2	162	ó	243	LATIN SMALL LETTER O WITH ACUTE
A3	163	ú	250	LATIN SMALL LETTER U WITH ACUTE
A4	164	Ą	260	LATIN CAPITAL LETTER A WITH OGONEK
A5	165	ą	261	LATIN SMALL LETTER A WITH OGONEK
A6	166	Ž	381	LATIN CAPITAL LETTER Z WITH CARON
A7	167	ž	382	LATIN SMALL LETTER Z WITH CARON
A8	168	Ę	280	LATIN CAPITAL LETTER E WITH OGONEK
A9	169	ę	281	LATIN SMALL LETTER E WITH OGONEK
AB	171	ż	378	LATIN SMALL LETTER Z WITH ACUTE
AC	172	Č	268	LATIN CAPITAL LETTER C WITH CARON
AD	173	ş	351	LATIN SMALL LETTER S WITH CEDILLA
B5	181	Á	193	LATIN CAPITAL LETTER A WITH ACUTE
B6	182	Â	194	LATIN CAPITAL LETTER A WITH CIRCUMFLEX
B7	183	Ě	282	LATIN CAPITAL LETTER E WITH CARON
B8	184	Ş	350	LATIN CAPITAL LETTER S WITH CEDILLA
BD	189	Ž	379	LATIN CAPITAL LETTER Z WITH DOT ABOVE
BE	190	ž	380	LATIN SMALL LETTER Z WITH DOT ABOVE
C6	198	Ă	258	LATIN CAPITAL LETTER A WITH BREVE
C7	199	ă	259	LATIN SMALL LETTER A WITH BREVE

Hex	Dec	Char	Unicode	ISO/IEC 10646-1:2000 Character Name
D0	208	đ	273	LATIN SMALL LETTER D WITH STROKE
D1	209	Ð	272	LATIN CAPITAL LETTER D WITH STROKE
D2	210	Ď	270	LATIN CAPITAL LETTER D WITH CARON
D3	211	Ë	203	LATIN CAPITAL LETTER E WITH DIAERESIS
D4	212	ď	271	LATIN SMALL LETTER D WITH CARON
D5	213	Ň	327	LATIN CAPITAL LETTER N WITH CARON
D6	214	Í	205	LATIN CAPITAL LETTER I WITH ACUTE
D7	215	Î	206	LATIN CAPITAL LETTER I WITH CIRCUMFLEX
D8	216	ě	283	LATIN SMALL LETTER E WITH CARON
DD	221	Ť	354	LATIN CAPITAL LETTER T WITH CEDILLA
DE	222	Û	366	LATIN CAPITAL LETTER U WITH RING ABOVE
E0	224	Ó	211	LATIN CAPITAL LETTER O WITH ACUTE
E1	225	ß	223	LATIN SMALL LETTER SHARP S
E2	226	Ô	212	LATIN CAPITAL LETTER O WITH CIRCUMFLEX
E3	227	Ŋ	323	LATIN CAPITAL LETTER N WITH ACUTE
E4	228	ñ	324	LATIN SMALL LETTER N WITH ACUTE
E5	229	ň	328	LATIN SMALL LETTER N WITH CARON
E6	230	Š	352	LATIN CAPITAL LETTER S WITH CARON
E7	231	š	353	LATIN SMALL LETTER S WITH CARON
E8	232	Ř	340	LATIN CAPITAL LETTER R WITH ACUTE
E9	233	Ú	218	LATIN CAPITAL LETTER U WITH ACUTE
EA	234	ř	341	LATIN SMALL LETTER R WITH ACUTE
EB	235	Û	368	LATIN CAPITAL LETTER U WITH DOUBLE ACUTE
EC	236	ý	253	LATIN SMALL LETTER Y WITH ACUTE
ED	237	Ý	221	LATIN CAPITAL LETTER Y WITH ACUTE
EE	238	ť	355	LATIN SMALL LETTER T WITH CEDILLA
F8	248	°	176	DEGREE SIGN
FB	251	ú	369	LATIN SMALL LETTER U WITH DOUBLE ACUTE
FC	252	Ř	344	LATIN CAPITAL LETTER R WITH CARON
FD	253	ř	345	LATIN SMALL LETTER R WITH CARON

Table 28. Character Settings (Turkey)

Hex	Dec	Char	Unicode	ISO/IEC 10646-1:2000 Character Name
20	32		32	SPACE
23	35	#	35	NUMBER SIGN

Hex	Dec	Char	Unicode	ISO/IEC 10646-1:2000 Character Name
24	36	\$	36	DOLLAR SIGN
25	37	%	37	PERCENT SIGN
26	38	&	38	AMPERSAND
27	39	'	39	APOSTROPHE
28	40	(	40	LEFT PARENTHESIS
29	41	)	41	RIGHT PARENTHESIS
2E	46	.	46	FULL STOP
30	48	0	48	DIGIT ZERO
31	49	1	49	DIGIT ONE
32	50	2	50	DIGIT TWO
33	51	3	51	DIGIT THREE
34	52	4	52	DIGIT FOUR
35	53	5	53	DIGIT FIVE
36	54	6	54	DIGIT SIX
37	55	7	55	DIGIT SEVEN
38	56	8	56	DIGIT EIGHT
39	57	9	57	DIGIT NINE
3A	58	:	58	COLON
40	64	@	64	COMMERCIAL AT
41	65	A	65	LATIN CAPITAL LETTER A
42	66	B	66	LATIN CAPITAL LETTER B
43	67	C	67	LATIN CAPITAL LETTER C
44	68	D	68	LATIN CAPITAL LETTER D
45	69	E	69	LATIN CAPITAL LETTER E
46	70	F	70	LATIN CAPITAL LETTER F
47	71	G	71	LATIN CAPITAL LETTER G
48	72	H	72	LATIN CAPITAL LETTER H
49	73	I	73	LATIN CAPITAL LETTER I
4A	74	J	74	LATIN CAPITAL LETTER J
4B	75	K	75	LATIN CAPITAL LETTER K
4C	76	L	76	LATIN CAPITAL LETTER L
4D	77	M	77	LATIN CAPITAL LETTER M
4E	78	N	78	LATIN CAPITAL LETTER N
4F	79	O	79	LATIN CAPITAL LETTER O
50	80	P	80	LATIN CAPITAL LETTER P
51	81	Q	81	LATIN CAPITAL LETTER Q

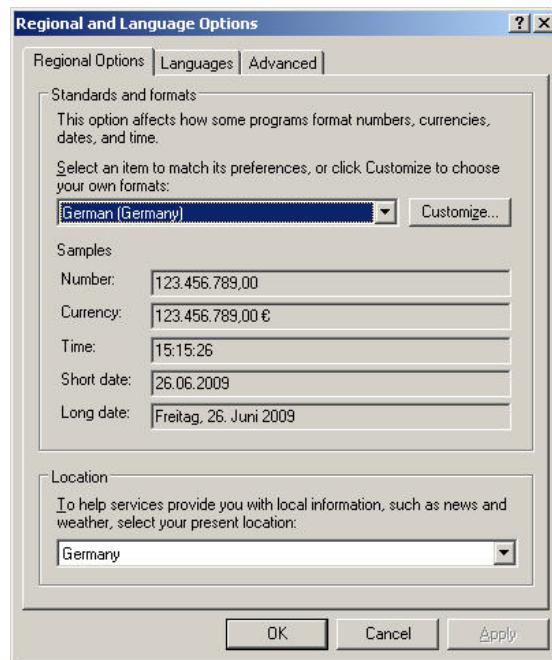
Hex	Dec	Char	Unicode	ISO/IEC 10646-1:2000 Character Name
52	82	R	82	LATIN CAPITAL LETTER R
53	83	S	83	LATIN CAPITAL LETTER S
54	84	T	84	LATIN CAPITAL LETTER T
55	85	U	85	LATIN CAPITAL LETTER U
56	86	V	86	LATIN CAPITAL LETTER V
57	87	W	87	LATIN CAPITAL LETTER W
58	88	X	88	LATIN CAPITAL LETTER X
59	89	Y	89	LATIN CAPITAL LETTER Y
5A	90	Z	90	LATIN CAPITAL LETTER Z
5F	95	_	95	LOW LINE
61	97	a	97	LATIN SMALL LETTER A
62	98	b	98	LATIN SMALL LETTER B
63	99	c	99	LATIN SMALL LETTER C
64	100	d	100	LATIN SMALL LETTER D
65	101	e	101	LATIN SMALL LETTER E
66	102	f	102	LATIN SMALL LETTER F
67	103	g	103	LATIN SMALL LETTER G
68	104	h	104	LATIN SMALL LETTER H
69	105	i	105	LATIN SMALL LETTER I
6A	106	j	106	LATIN SMALL LETTER J
6B	107	k	107	LATIN SMALL LETTER K
6C	108	l	108	LATIN SMALL LETTER L
6D	109	m	109	LATIN SMALL LETTER M
6E	110	n	110	LATIN SMALL LETTER N
6F	111	o	111	LATIN SMALL LETTER O
70	112	p	112	LATIN SMALL LETTER P
71	113	q	113	LATIN SMALL LETTER Q
72	114	r	114	LATIN SMALL LETTER R
73	115	s	115	LATIN SMALL LETTER S
74	116	t	116	LATIN SMALL LETTER T
75	117	u	117	LATIN SMALL LETTER U
76	118	v	118	LATIN SMALL LETTER V
77	119	w	119	LATIN SMALL LETTER W
78	120	x	120	LATIN SMALL LETTER X
79	121	y	121	LATIN SMALL LETTER Y
7A	122	z	122	LATIN SMALL LETTER Z

Hex	Dec	Char	Unicode	ISO/IEC 10646-1:2000 Character Name
7E	126	~	126	TILDE
80	128	Ç	199	LATIN CAPITAL LETTER C WITH CEDILLA
81	129	ü	252	LATIN SMALL LETTER U WITH DIAERESIS
82	130	é	233	LATIN SMALL LETTER E WITH ACUTE
83	131	âyyy	226	LATIN SMALL LETTER A WITH CIRCUMFLEX
84	132	ä	228	LATIN SMALL LETTER A WITH DIAERESIS
85	133	à	224	LATIN SMALL LETTER A WITH GRAVE
86	134	â	229	LATIN SMALL LETTER A WITH RING ABOVE
87	135	ç	231	LATIN SMALL LETTER C WITH CEDILLA
88	136	ê	234	LATIN SMALL LETTER E WITH CIRCUMFLEX
89	137	ë	235	LATIN SMALL LETTER E WITH DIAERESIS
8A	138	è	232	LATIN SMALL LETTER E WITH GRAVE
8B	139	ï	239	LATIN SMALL LETTER I WITH DIAERESIS
8C	140	î	238	LATIN SMALL LETTER I WITH CIRCUMFLEX
8D	141	ı	305	LATIN SMALL LETTER DOTLESS I
8E	142	Ä	196	LATIN CAPITAL LETTER A WITH DIAERESIS
8F	143	Å	197	LATIN CAPITAL LETTER A WITH RING ABOVE
90	144	É	201	LATIN CAPITAL LETTER E WITH ACUTE
91	145	æ	230	LATIN SMALL LETTER AE
92	146	Æ	198	LATIN CAPITAL LETTER AE
93	147	ô	244	LATIN SMALL LETTER O WITH CIRCUMFLEX
94	148	ö	246	LATIN SMALL LETTER O WITH DIAERESIS
95	149	ò	242	LATIN SMALL LETTER O WITH GRAVE
96	150	û	251	LATIN SMALL LETTER U WITH CIRCUMFLEX
97	151	ù	249	LATIN SMALL LETTER U WITH GRAVE
98	152	İ	304	LATIN CAPITAL LETTER I WITH DOT ABOVE
99	153	Ö	214	LATIN CAPITAL LETTER O WITH DIAERESIS
9A	154	Ü	220	LATIN CAPITAL LETTER U WITH DIAERESIS
9B	155	ø	248	LATIN SMALL LETTER O WITH STROKE
9D	157	Ø	216	LATIN CAPITAL LETTER O WITH STROKE
9E	158	Ş	350	LATIN CAPITAL LETTER S WITH CEDILLA
9F	159	ş	351	LATIN SMALL LETTER S WITH CEDILLA
A0	160	á	225	LATIN SMALL LETTER A WITH ACUTE
A1	161	í	237	LATIN SMALL LETTER I WITH ACUTE
A2	162	ó	243	LATIN SMALL LETTER O WITH ACUTE
A3	163	ú	250	LATIN SMALL LETTER U WITH ACUTE

Hex	Dec	Char	Unicode	ISO/IEC 10646-1:2000 Character Name
A4	164	ñ	241	LATIN SMALL LETTER N WITH TILDE
A5	165	Ñ	209	LATIN CAPITAL LETTER N WITH TILDE
A6	166	Ĝ	286	LATIN CAPITAL LETTER G WITH BREVE
A7	167	ğ	287	LATIN SMALL LETTER G WITH BREVE
A8	168	¿	191	INVERTED QUESTION MARK
B5	181	Á	193	LATIN CAPITAL LETTER A WITH ACUTE
B6	182	Â	194	LATIN CAPITAL LETTER A WITH CIRCUMFLEX
B7	183	À	192	LATIN CAPITAL LETTER A WITH GRAVE
C6	198	ã	227	LATIN SMALL LETTER A WITH TILDE
C7	199	Ã	195	LATIN CAPITAL LETTER A WITH TILDE
D2	210	Ê	202	LATIN CAPITAL LETTER E WITH CIRCUMFLEX
D3	211	Ë	203	LATIN CAPITAL LETTER E WITH DIAERESIS
D4	212	È	200	LATIN CAPITAL LETTER E WITH GRAVE
D6	214	Í	205	LATIN CAPITAL LETTER I WITH ACUTE
D7	215	Î	206	LATIN CAPITAL LETTER I WITH CIRCUMFLEX
D8	216	Ï	207	LATIN CAPITAL LETTER I WITH DIAERESIS
DE	222	Ì	204	LATIN CAPITAL LETTER I WITH GRAVE
E0	224	Ó	211	LATIN CAPITAL LETTER O WITH ACUTE
E1	225	ß	223	LATIN SMALL LETTER SHARP S
E2	226	Ô	212	LATIN CAPITAL LETTER O WITH CIRCUMFLEX
E3	227	Ò	210	LATIN CAPITAL LETTER O WITH GRAVE
E4	228	õ	245	LATIN SMALL LETTER O WITH TILDE
E5	229	Õ	213	LATIN CAPITAL LETTER O WITH TILDE
E6	230	μ	181	MICRO SIGN
E9	233	Ú	218	LATIN CAPITAL LETTER U WITH ACUTE
EA	234	Û	219	LATIN CAPITAL LETTER U WITH CIRCUMFLEX
EB	235	Ù	217	LATIN CAPITAL LETTER U WITH GRAVE
EC	236	ì	236	LATIN SMALL LETTER I WITH GRAVE
ED	237	ÿ	255	LATIN SMALL LETTER Y WITH DIAERESIS
F8	248	°	176	DEGREE SIGN

Procedure

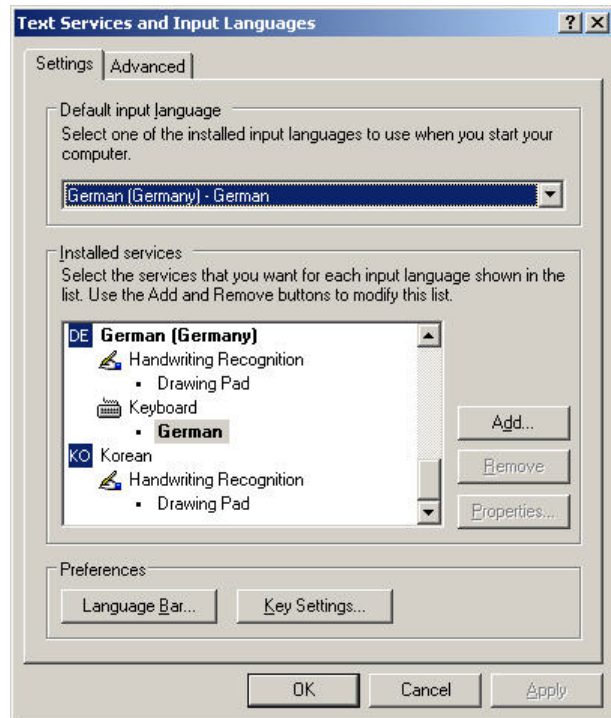
1. In Windows, click Start>Settings>Control panel.
2. Double-click **Regional and Language Options**. The *Regional and Language Options* dialog box displays.



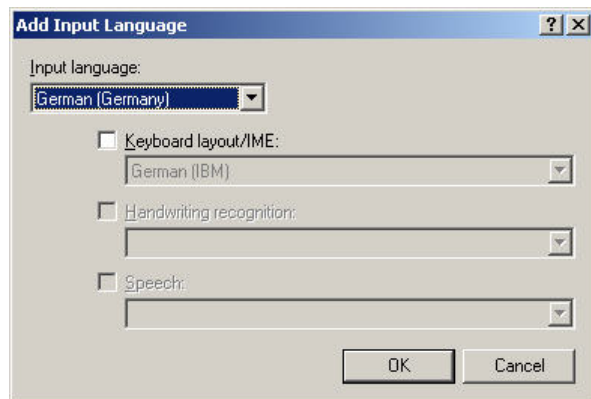
3. On the *Regional Options* tab under **Standards and formats**, select the language for displaying standards and formats such as format numbers, currencies, dates, and time.
4. Under **Location**, select the matching country for supporting you with local services such as news and weather.
5. Select the *Languages* tab.
6. If you want to support Arabic, Armenian, Georgian, Thai, Hebrew, Indic, Thai and Vietnamese languages, check **Install files for complex script and right-to-left languages (including Thai)**.
7. If you want to support Japanese, Chinese and Korean languages, check **Install files for East Asian languages** under **Supplemental language support**.
8. Make sure that you have the necessary harddisk space indicated in the message boxes displayed. Close the message boxes by clicking **OK**.

After confirming by clicking **OK** or **Apply**, the additional files will be installed on the PC.

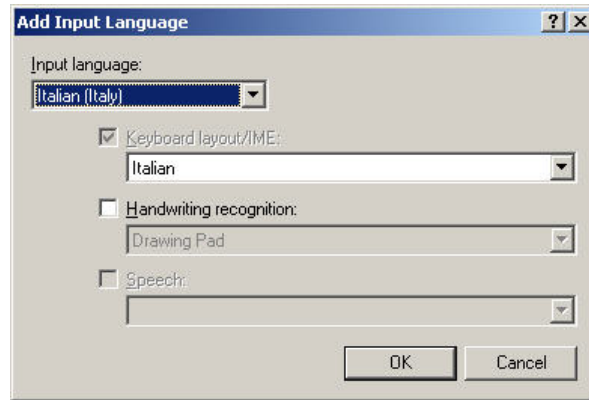
9. After successful installation, repeat steps 1 through 5, and then proceed with step 10.
10. Click **Details** button. The *Text Services and Input Languages* dialog box displays. The actual input language is selected in **Default input language** and the corresponding installed services are highlighted in bold under **Installed services**.



11. To add a new input language, click the **Add** button. The *Add Input Language* dialog box displays.



12. In **Input Language**, select the language, in this case Italian. Check/select optional settings for Keyboard layout/IME, Handwriting recognition and Speech if available and if desired.



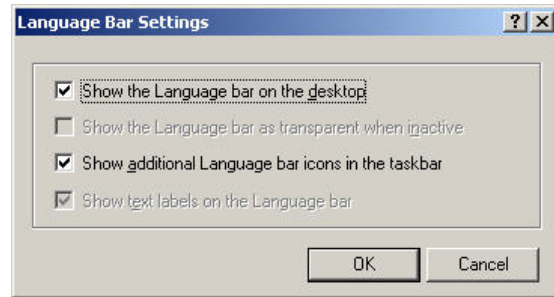
13. Click **OK**. The new language and its services are added to the *Installed Services* list and can be selected as default input language.



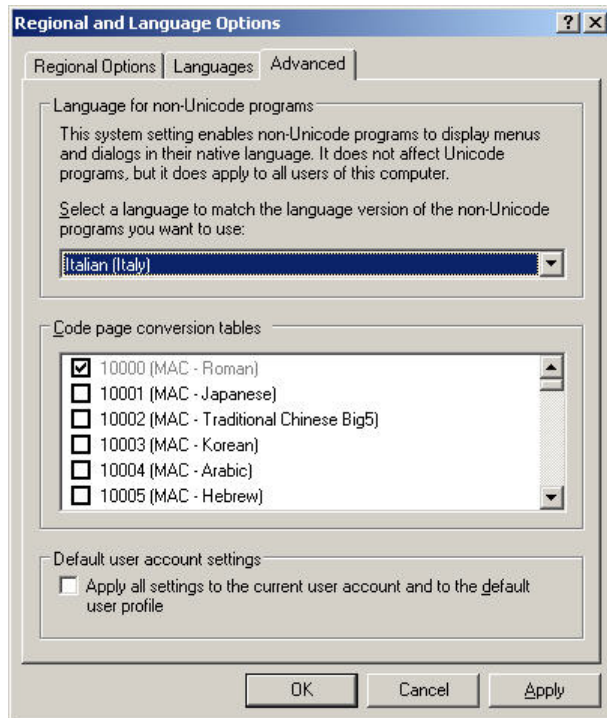
14. In **Default input language**, select the language, in this case Italian.



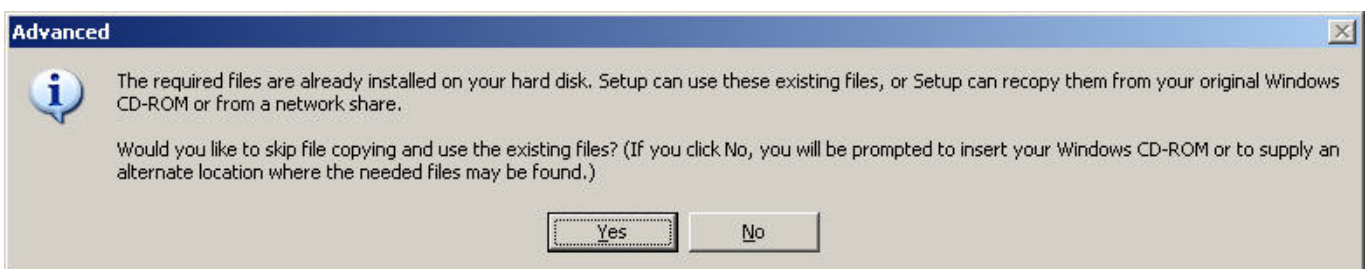
15. In the *Text Services and Input Languages* dialog box, click the **Language bar** button. The *Language Bar Settings* dialog box displays. Check **Show the Language bar on the desktop** and **Show additional Language bar icons in the task bar**. These enabled options allow toggling between several language(s) on the desktop and in the taskbar after the customization is finished.



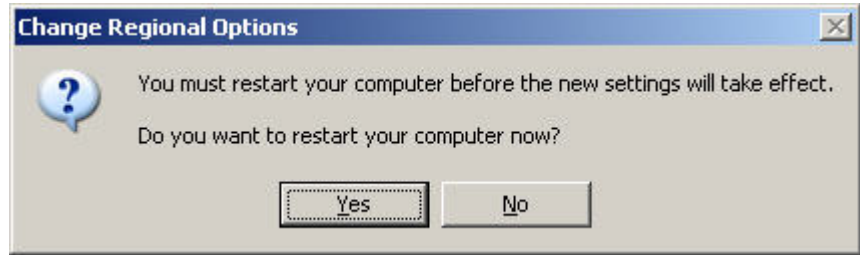
16. Click **OK**.
17. In the *Text Services and Input Languages* dialog box, click **OK**, and then select the *Advanced* tab in the *Regional and Language Options* dialog box.



18. In **Language for non-Unicode programs**, select the language, in this case Italian.
19. Click **OK** to save all settings. The *Advanced* message box may display.



20. Follow the instructions described in the message box, and close the message box. The *Change Regional Options* message box displays.



21. Restart the PC by clicking Yes. After restart, the new language, in this case Italian is added to the *Language* bar.



22. Check the language in the *Language* bar.
23. For selecting the language in CARE, COACH, XL-Online respectively in COACH Online, please refer to the corresponding Online Help and/or PDF documentation.

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