

INSTRUCTION MANUAL

DIN Rail Mounted Indicating Controller DCL-33A

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For detailed usage, refer to the Instruction Manual for the DCL-33A. Please download the full Instruction Manual from Shinko website https://shinko-technos.co.jp/e/ → Support & Downloads → Downloads → Manuals

Thank you for purchasing our DCL-33A, DIN Rail Mounted Indicating Controller. This manual contains instructions for the mounting, functions, operations and notes when operating the DCL-33A. To ensure safe and correct use, thoroughly read and understand this manual before using this instrument. To prevent accidents arising from the misuse of this instrument, please ensure the operator receives this manual.

Safety Precautions (Be sure to read these precautions before using our products.) The safety precautions are classified into 2 categories: "Warning" and "Caution".

Marning: Procedures which may lead to dangerous conditions and cause death or serious injury, if not carried out properly.

A Caution: Procedures which may lead to dangerous conditions and cause superficial to medium injury or physical damage or may degrade or damage the product, if not carried out properly.

⚠ Warning

- To prevent electric shock or fire, only Shinko or other qualified service personnel may handle the inner
- To prevent electric shock, fire or damage to the instrument, parts replacement may only be undertaken by Shinko or other qualified service personnel

A SAFETY PRECAUTIONS

- To ensure safe and correct use, thoroughly read and understand this manual before using this instrument
- This instrument is intended to be used for industrial machinery, machine tools and measuring equipment. Verify correct usage after purpose-of-use consultation with our agency or main office. (Never use this instrument for medical purposes with which human lives are involved.)
- · This instrument is designed to be installed on a DIN rail in an indoor control panel. If it is not, measures must be taken to ensure that the operator cannot touch power terminals or other high voltage sections.
- External protection devices such as protective equipment against excessive temperature rise, etc. must be installed, as malfunction of this product could result in serious damage to the system or injury to personnel Proper periodic maintenance is also required.
- This instrument must be used under the conditions and environment described in this manual. Shinko Technos Co., Ltd. does not accept liability for any injury, loss of life or damage occurring due to the instrument being used under conditions not otherwise stated in this manual.

Compliance with Safety Standards

⚠ Caution

- Always install the recommended fuse described in this manual externally.
- If the instrument is used in a manner not specified by the manufacturer, the protection provided by the instrument may be impaired.
- Use a device with reinforced insulation or double insulation for the external circuit connected to this product
- When using this product as a UL certified product, use a power supply conforming to Class 2 or LIM for the external circuit connected to the product.

A Caution for Installation

This instrument is intended to be used under the following environmental conditions (IEC61010-1)]: Overvoltage category II, Pollution degree 2 Ensure the mounting location corresponds to the following conditions:

- A minimum of dust, and an absence of corrosive gases
 No flammable, explosive gases
- No mechanical vibrations or shocks
- No exposure to direct sunlight, an ambient temperature of 0 to 50 days to 122_T) that does not change rapidly, and no icing.
- An ambient non-condensing humidity of 35 to 85 %RH
- No large capacity electromagnetic switches or cables through which large current is flowing
- No water, oil or chemicals or where the vapors of these substances can come into direct contact with the unit
- Take note that the ambient temperature of this unit not the ambient temperature of the control panel - must not exceed 50 (122) if mounted within a control panel, otherwise the life of electronic components (especially electrolytic capacitors) may be shortened.

⚠ Caution with Respect to Export Trade Control Ordinance To avoid this instrument from being used as a component in, or as being utilized in the manufacture of weapons of mass destruction (i.e. military applications, military equipment, etc.), please investigate the end users and the final use of this instrument. In the case of resale, ensure that this instrument is not illegally exported.

Warning on Model Label

A Caution

Failure to handle this instrument properly may result in minor or moderate injury or property damage due to fire, malfunction, malfunction, or electric shock. Please read this manual before using the product to ensure that you fully understand the product.

Specifications

Power supply voltage	100 to 240 V AC 50/60 Hz, Allowable voltage fluctuation: 85 to 264 V AC 24 V AC/DC 50/60 Hz, Allowable voltage fluctuation: 20 to 28 V AC/DC				
	Thermocouple input: Within $\pm 0.2\%$ of each input span ± 1 digit, or $\pm 2 \pm (4 \pm)$, whichever is greater				
Base accuracy (at ambient	However, R, S inputs, 0 to 200 □ (32 to 392 □): Within ±6 □ (12 □) B input, 0 to 300 □ (32 to 572 □): Accuracy is not guaranteed. K, J, E, T, N inputs, Less than 0 □ (32 □):				
temperature 23T, for a single unit	Within $\pm 0.4\%$ of input span ± 1 digit, or $\pm 4 \pm (8 \pm)$,				
mounting)	whichever is greater RTD input: Within ±0.1% of each input span±1 digit, or ±1≡ (2⊤), whichever is greater				
	DC voltage input: Within ±0.2% of each input span±1 digit				
	Direct current input: Within ±0.2% of each input span±1 digit				
Input sampling period	125 ms				
Power	100 to 240 V AC: Approx. 5 VA max.				
consumption	24 V AC: Approx. 4 VA max. 24 V DC: Approx. 4 W max.				
Ambient Temperature, Humidity	0 to 50√, 35 to 85 %RH (Non-condensing)				
Altitude	2,000 m or less				
Weight	Approx. 100 g				
Accessories Instruction manual excerpt: 1 copy When W option is ordered: Connector harness W 3 m 1 length When W option (5A, 10A, 20A) is ordered: CT (CTL-6S) 1 piec When W option (50A) is ordered: CT (CTL-12-S36-10L1U) 1 p When EI option is ordered: Connector harness AOJ 3 m 1 leng When EA option is ordered: Connector harness AOJ 3 m 1 leng					
	Relay contact: 1a, Control capacity: 3 A 250 V AC (resistive load) 1 A 250 V AC (inductive load $\cos\phi$ =0.4) Electrical life: 100,000 cycles				
Control output (OUT1)	Non-contact voltage (for SSR drive): 12 V DC ±15% Max 40 mA (short circuit protected)				
<u>'</u>	Direct current: 4 to 20 mA DC,				
	Load resistance: Max 550 ♀ Output accuracy: Within ±0.3% of output span				
	Resolution: 12000				

Alarm output:

(Alarm, Loop break alarm and optional Heater burnout alarm utilize commor

The alarm action point is set by \pm deviation from the SV (excluding Process alarm), and if the input goes outside the range, alarm is turned ON or OFF (High/ Low limit range alarm).

When De-energized action is selected in [Alarm Energized/De-energized], alarm is activated conversely

Setting accuracy: Same as base accuracy

Action: ON/OFF action

Hysteresis: Thermocouple, RTD inputs: 0.1 to 100.0 (□)

DC voltage, current inputs: 1 to 1000 (The placement of the decimal point follows the selection.)

Output: Open collector, Control capacity: 0.1 A 24 V DC

Alarm type: High limit alarm, Low limit alarm, High/Low limits alarm, High/Low limits independent alarm, High/Low limit range alarm, High/Low limit range independent alarm, Process high alarm, Process low alarm, High limit with standby alarm. Low limit with standby alarm. High/Low limits with standby alarm, High/Low limits with standby independent

Energized/De-energized action are applied to the above alarms, totaling 24 alarm types. No alarm action can also be selected.

Alarm Energized/De-energized: Alarm output Energized/ De-energized can

	Alarm Energized	Alarm De-energized			
EVT indicator (Red)	Lit	Lit			
EVT output	ON	OFF			

Alarm HOLD function: Once an alarm is activated, the alarm output is maintained until the power is turned off.

Loop break alarm output:

(Loop break alarm, Alarm and optional Heater burnout alarm utilize commo output terminals.)

Detects heater burnout, sensor burnout and actuator trouble. Setting range:

Loop break alarm time: 0 to 200 minutes

Loop break alarm span:

Thermocouple, RTD inputs: 0 to 150[™] (▼) or 0.0 to 150.0[™] (▼) DC voltage, current inputs: 0 to 1500 (The placement of the decimal point

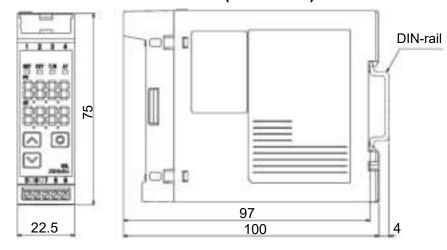
follows the selection) Output: Open collector, Control capacity: 0.1 A 24 V DC

Heating/Cooling OUT2) (DC option)

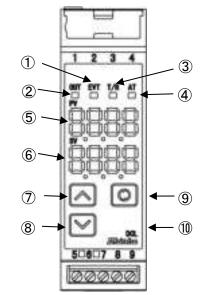
EVT output

Output: Open collector. Control capacity: 0.1 A 24 V DC

External Dimensions (Scale: mm)



Name and Functions

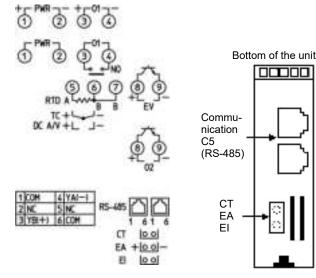


No.	Name	Description				
1	EVT indicator	The red LED lights when Event output (Alarm, Loop break alarm or optional Heater burnout alarm) is ON. The red LED also lights when Cooling output is ON if Heating/Cooling control option is ordered.				
2	OUT indicator	The green LED lights when OUT (control output) is ON (when Heating output is ON if Heating/Cooling control option is ordered). For Direct current output, flashes in 125 ms cycles corresponding to the output MV.				
3	T/R indicator	The yellow LED flashes during Serial communication TX output (transmitting).				
4	AT indicator	The yellow LED flashes while auto-tuning (AT) is performing.				
(5)	PV Display	Indicates the PV (process variable), or setting characters in setting mode with a red LED.				
6	SV Display	Indicates the SV (desired value), output MV (manipulated variable) or each set value in each setting mode with a green LED.				
7	UP key	Increases the numeric value.				
8	DOWN key	Decreases the numeric value.				
9	MODE key	Switches the setting mode or registers the set data. (Registers the set data by pressing the MODE key.)				
10	SUB-MODE key	Enters Auxiliary function setting mode 2 in combination with the MODE key. If 'Control output OFF' is selected in [SUB-MODE key function]: Turns all outputs OFF as if the power were turned OFF. If 'Auto/Manual control' is selected in [SUB-MODE key function]: Switches the Auto/Manual control. If 'Alarm HOLD cancel' is selected in [SUB-MODE key function]: Cancels Alarm HOLD.				

Caution ΔN

- When setting the specifications and functions of this unit, connect mains power cable to terminals 1 and 2 first, then set them referring to "Key Operation Flowchart", before "Mounting to the Control Panel" and "Wiring"
- Do not pull or bend the lead wire on the terminal side when wiring or after wiring, as it could cause malfunction.

Terminal Arrangement



Name	Description			
PWR (POWER SUPPLY)	100 to 240 V AC or 24 V AC/DC For 24 V DC, ensure polarity is correct.			
01	Control output (OUT1)			
TC	Thermocouple			
RTD	Resistance temperature detector			
DC	Direct current or DC voltage For Direct current input (when "Externally mounted 50 \(\Pi \) shunt resister" is selected), connect a 50 \(\Pi \) shunt resistor between input terminals.			
EV	Event output Outputs when Alarm, Loop break alarm or Heater burnout alarm (W option) is ON.			
O2	Cooling output (DC option)			
RS-485	Serial communication (C5 option)			
CT	Current transformer input (W option)			
EA	External setting input (EA option)			
EI	DI1 input (El option)			

When using ferrules, use the following ferrules made by Phoenix Contact GMBH & CO.

Recommend	ded Ferrules	and Crimping Pliers	•		
Terminal Number			Conductor Cross Sections	Tightening Torque	Crimping Pliers
1 to 4	M2.6	AI 0.25-8 YE	0.2 to 0.25 mm ²		CRIMPFOX ZA 3 CRIMPFOX UD 6
		AI 0.34-8 TQ	0.25 to 0.34 mm ²		
		AI 0.5-8 WH	0.34 to 0.5 mm ²	0.5 to 0.6 N·m	
		AI 0.75-8 GY	0.5 to 0.75 mm ²	0.5 10 0.6 11111	
		AI 1.0-8 RD	0.75 to 1.0 mm ²		
		AI 1.5-8 BK	1.0 to 1.5 mm ²		
5 to 9		AI 0.25-8 YE	0.2 to 0.25 mm ²		
	M2.0	AI 0.34-8 TQ	0.25 to 0.34 mm ²	0.22 to 0.25 N·m	
		AI 0.5-8 WH	0.34 to 0.5 mm ²		

Key Operation Flowchart

Basic Operation Procedure

[Step 2] Auxiliary function setting

PV/SV Display

PV RT AT Perform/Cancel

P B OUT2 proportional

Integral time

.0

ARW

OUT1

3 proportional cycle

0

Derivative time

.0

OUT1 proportional

[Sub setting mode]

sv 2.5 band

av 1.0 band

003 m

™ 50

IV - - - -

A+0

mode 2

Set the input type, Alarm 1 type and SV1 (desired value), following the procedure below. Setting item numbers (1), (2), (3), (4), (5), (6), (7) and (8) are indicated on the flowchart. Turn the load circuit power OFF, and turn the power to the Operation before RUN DCL-33A ON. Select an input type and Alarm 1 type, etc. in Auxiliary function

setting mode 2. (1) Select an input type in [Input type]. (2) Select Alarm 1 type in [Alarm 1 type].

If any Alarm 1 type except (""") is selected, (3) to (6) will be indicated. Set them if necessary. Note: If Alarm 1 type is changed, the Alarm 1 value will default to 0 (0.0). Therefore, set the alarm value again.

(3) Select either Energized or De-energized in [Alarm 1 Energized/De-energized]. (4) Select either Holding or Not holding in [Alarm 1 HOLD function].

(5) Set Alarm 1 hysteresis in [Alarm 1 hysteresis]. (6) Set Alarm 1 delay time in [Alarm 1 delay time]

sv 0.0

PVRI

[Step 3] Sub setting mode (7) Set Alarm 1 value in [Alarm 1 value]. [Step 4] Main setting mode (8) Set SV1 (desired value) in [SV1 (desired value)]

Turn the load circuit power ON. Control action starts so as to [Step 5] RUN keep the control target at SV1 (desired value).

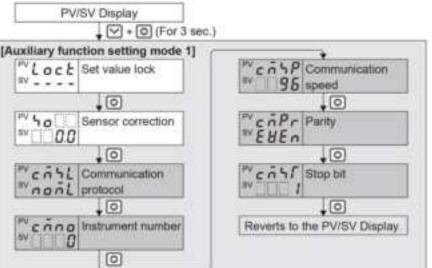
PV/SV Display PV/SV Display 10 [Main setting mode] SV1 (Desired value) 10 10 Reverts to the PV/SV Display. Reverts to the PV/SV Display.

(For 3 sec.) Output MV (manipulated variable) indication

About Setting Item

- Upper left : PV Display: Indicates setting characters. Lower left: SV Display: Indicates the factory default. Right side : Indicates the setting item.
- This setting item is optional, and appears only when the option is ordered.

C-b OUT2 3 proportional cycle 10 r SET Manual reset 10 Alarm 1 value .0 Heater burnout 0.0 alarm value 10 PV L P _ F Loop break alarm time 10 LP_H Loop break alarm band 10 Reverts to the PV/SV Display. PV HYS OUT1 ON/OFF 10 hysteresis



Alarm Type

High limit with

H/L limits with

H/L limits with

standby, Low limit with standby,

High limit alarm	The alarm action is ±deviation setting from the SV. The alarm is activated if the input value reaches the high limit set value.
Low limit alarm	The alarm action is #deviation setting from the SV. The alarm is activated if the input value drops below the low limit set value.
High/Low limits alarm	Combines High limit and Low limit alarm actions. When input value reaches the high limit set value or drops below the low limit set value, the alarm is activated.
High/Low limit range alarm	When input value is between the low limit and high limit set values, the alarm is activated.
Process alarm	Within the scale range of the controller, alarm action points can be set at random and if the input reaches the randomly set action point, the alarm is activated.
High/Low limits independent	High limit and low limit set values can be set respectively. The alarm is activated when the input value exceeds the high limit set value or drops below the low limit set value.
High/Low limit range independent	High limit and low limit set values can be set respectively. The alarm is activated when the input value is between the low limit and high limit set values.
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exceeds the alarm action point.)

After the power supply to the instrument is turned on, even

if the input enters the alarm action range, the alarm is not

activated. If SV is changed while the controller is running,

the alarm is not activated even if the input is in the alarm

action range. (If the controller is allowed to keep running, the standby function will be released once the input

Character Indication

AT Perform/Cancel	Input Type	C F C(W/Re5-26) 0 - 4200°F	HL H/L limits alarm	COB! Converter	SV Rise/Fall rate start type
AT Cancel	E C K -200 - 1370 K	PF F P1100 -199.9-999.9"F	ਹੈ। d H/L limit range	Event input OI allocation (*3)	与おり SV start
8.5 AT Perform	E C K -199.9 - 400.070		85 Process high alarm	GGG No event	PBSF PV start
Set value lock	J E J -200 - 1000°C	The state of the s	-85 Process low alarm	☐ ☐ ☐ / Set value memory	Control output OUT1/EVT
Unlock	C C R 0-1760°C	The state of the s	H High limit with standby	CO2 Control ON/OFF	ouf ! outs
Lac / Look 1	5 C S 0 - 1760°C		Low limit with standby	☐ ☐ ☐ ☐ Direct/Reverse action	ERL EAL
Loce Lock 2	6 € B 0-1820°C		HL U HL limits with standby	□DDY Preset output 1	Heater burnout alarm output
Loc3 Lock 3	E C E -200 - 600 C	G 18 0-1V -1999-9999	1 HL Ints independent	Ole Oli	Enabled/Disabled On Disabled
Communication protocol	F T -199.9 - 400.00	0 58 0-5V -1999-9999	, -, , H/L limit range	DOS Preset output 2	The Street Contract of the Con
non' Shinko protocol	O E N -200-1300'0	The state of the s	i ui d independent alarm	Ole Oli	984 Enabled
nodR Modbus ASCII mode	PL 25 PL 1 0-1390'0		and the second second	DDS Auto/Manual control	Loop break alarm output Enabled/Disabled
nodr Modbus RTU mode	C C(W/Re5-26) 0 - 2315*C	the difference of the difference of the contract of the contra	# HL imits with standby	007 Integral action Holding	no Disabled
bont Shinko protocol	PF C P1100 -199.9 - 850.00			008 Set value memory	984 Enabled
(Block Read/Write)	JPTE JP1100 -199.9 - 500.010	The second secon	A1 - A4 Energized De-energized	COS Control ON/OFF	A1 - A4 output Enabled/Disabled
bada Modbus ASCII mode		Control of the Contro	nont Energized	☐ ☐ ☐ Direct/Reverse action	140 000
(Brock Read/Write)		The first management houses	← E 84 De-energized	Preset output 1	Indian Military and Commission of the Commission
badr Modbus RTU mode (Block Read/Write)	JP[[JP1100 -200-500%	- Indian September 1	A1 - A4 HOLD function	ONOFF	46.54
Communication speed	E F K -320 - 2500"	CACACA SE SEGUE SECUE PERSON	nonE Not holding	□0 12 Preset output 2	SUB-MODE key function
CONTRACTOR PROCESS AND PROPERTY OF THE PROPERT	E F K -199.9-750.01	COCC 3 digits after point	HoLd Holding	ON/OFF	OFF Control output OFF
24 2400 bps	J F J -320 - 1800'9	OUT2 cooling method	Direct/Reverse action	C 13 Auto/Manual control	∩R∩U Auto/Manual control
4800 bps	C F R 0-32001	Rt c Air cooling	HERE Reverse action	2 14 Integral action Holding	RLoF Alarm HOLD cancel
38 9600 bps	5 F S 0-3200"	The state of the s	COOL Direct action	A1 - A4 value 0 Enabled/Disabled	Auto/Manual control after
192 19200 bps		1	Output status when input errors occur	OO Disabled	power ON
384 38400 bps	The Part of the Contract of th	tellinone at the control of the cont	PROCESSOR AND AND PROCESSOR AND ADDRESSOR ADDRESSOR AND ADDRESSOR AND ADDRESSOR ADDRESSOR AND ADDRESSOR AND ADDRESSOR ADDRESSOR AND ADDRESSOR ADDRESSOR AND ADDRESSOR AND ADDRESSOR ADDRESSOR AND ADDR	984 Enabled	RUI o Automatic control
Parity	The state of the s			Remote/Local	ARAU Manual control
nonE No parity	F T -199.9 - 750.0°		on Dutput ON	William Control	
EBEn Even	n F N -320-23001	The state of the s	Controller/Converter	Loci Local	
odd Odd	PL2F PL-1 0-25001	Low limit alarm	COLC Controller	rEnr Remote	lâ

 $(^*1)$ Externally mounted 50Ω shurt resistor $(^*2)$ Built-in 50Ω shurt resistor $(^*3)$ 001 to 007. Works when contacts are closed (input ON). Press and hold the key and key (in that order).

O08 to 014: Works when contacts are open (input OFF).

(For 3 sec): Press and hold the key and key (in that order) together for approx. 3 seconds.

+ ② (For 3 sec): Press and hold the key and key (in that order) together for approx. 3 seconds.
 + ② (For 3 sec): Press and hold the key and key (in that order) together for approx. 3 seconds.

Set or select each item with the △ or ☑ key, and register the value with the ⑥ key.

If the O key is pressed, the unit proceeds to the next item, illustrated by an arrow.

PV/SV Display + (O) (For 3 sec.) [Auxiliary function setting mode 2] TV 5 E n 5 Input type HYSB OUTZ ON/OFF 10 hysteresis 10 PV SC L H Scaling high limit ■ 1370 10 PV SC LL Scaling low limit ® - 200 10 dP Decimal point place 10 PV F1 L | PV filter time (5) EV 1.0 IV 0.0 constant 10 o L H OUT1 high limit (6) (7) "V 100 of L OUT1 low limit

10

0

.0

10

0

db Overlap/Dead band

cRcf OUT2 cooling

o L H b OUT2 high limit

ollb OUT2 low limit

RI r method

100

(2) PV RL IF Alarm 1 type PV R 1L n Alarm 1 Energized/ (3) By nank De-energized .0 PV A IHd Alarm 1 (4) IV nanE HOLD function .0 PV R 1HY Alarm 1 hysteresis PV R 1d Y Alarm 1 delay time canf Direct/Reverse W HERF action "V RF _ b AT bias 10 S " 48 _ 6 SVTC bias EaUI Output status when oFF input errors occur 10 FUnc Controller/Converter colr Reverts to the PV/SV Display.

PV/SV Display + - (For 3 sec.) [Auxiliary function setting mode 3] PV E1 n Event input 000 DI allocation SV2 PV R 1 = R Alarm 1 value 0 no Enabled/Disabled 10 PV R 1H Alarm 1 high limit alarm value .0 PV RL 2F Alarm 2 type PV R 2 E R Alarm 2 value 0 Enabled/Disabled Alarm 2 value PV R 2 H Alarm 2 high limit alarm value 10 PV R 2 L n Alarm 2 Energized/ nonL De-energized 10 PV R 2 H d Alarm 2 "nanE HOLD function 10 PV R 2 H Y Alarm 2 hysteresis 10 PV R 2 d Y Alarm 2 delay time

PV RL 3F Alarm 3 type ----R3 = R Alarm 3 value 0 no Enabled/Disabled 10 Alarm 3 value PV R 3H Alarm 3 high limit alarm value 10 PV R 3L n Alarm 3 Energized/ VoorL De-energized .0 R3Hd Alarm 3 "One HOLD function 10 R3HY Alarm 3 hysteresis ■× □ 1.0 " R 3 d Y Alarm 3 delay time RL 4F Alarm 4 type RYER Alarm 4 value 0 no Enabled/Disabled 10 RY Alarm 4 value 10 PV R Y H Alarm 4 high limit

0

 To revert to the PV/SV Display, press the key for approx. 3 seconds in any mode. PV RYL & Alarm 4 Energized/ Ho SL Heater burnout alarm nonL De-energized 10 10 PV RYHd Alarm 4 YES Enabled/Disabled nonE HOLD function 10 10 RYHY Alarm 4 hysteresis PV R 15L Alarm 1 output 10 .0 PV R Y d Y Alarm 4 delay time 825L Alarm 2 output 10 PY r En [Remote/Local PV R 3 5 L Alarm 3 output "Lock 10 PY C _ b Remote bias RYSL Alarm 4 output .0 PY PS I OUT1 MV preset CFLH External setting NV 1370 input high limit D.D value 10 .0 " r T L L External setting "PSI 2 OUT2 MV preset 0.0 value " - 20.0 input low limit 10 c 8 5 5 SV Rise/Fall rate nanu SUB-MODE key SV 585 start type of F function .0 r R I U SV rise rate W RUI a after power ON 10 10 r R f d SV fall rate 10 PV PoUT Control output EV OUT 1 OUT 1/EVT

0

W YE S output Enabled/Disabled LPSL Loop break slarm output no Enabled/Disabled No Enabled/Disabled enabled/Disabled n Rr 5 Auto/Manual control Reverts to the PV/SV Display.