Fronius RI FB PRO Setting The Bus Module Instruction Manual

Contents

Fronius RI FB PRO Setting The Bus Module

Specifications

- **Vendor ID:** 0000 02C1hex (705dez)
- **Product Code:** 0000 0320hex (800dez)
- **Device Name:** Fronius FB Pro CANopen

Product Usage Instructions

Setting up the Node Address of the Bus Module

The node address of the bus module can be set using the DIP switch on the interface:

1. **Range:** 1 to 63
2. **DIP Switch Positions:**
    - 1: OFF OFF OFF OFF OFF ON
    - 2: OFF OFF OFF OFF ON OFF
    - 3: OFF OFF OFF OFF ON ON…
    - 62: ON ON ON ON ON OFF
    - 63: ON ON ON ON ON ON

Setting Process Data Width of the Bus Module

- The process data width of the bus module can be adjusted as per the requirements outlined in the manual.

Input and Output Signals

The product utilizes different data types for signals:

- **UINT16 (Unsigned Integer)**: Range from 0 to 65535
- **SINT16 (Signed Integer)**: Range from -32768 to 32767

Working Mode Bit Configuration

- The product has specific bits allocated for working mode configurations such as Welding Start, Robot Ready, Gas On, and more. Refer to the provided table for detailed information on each bit's function.

General

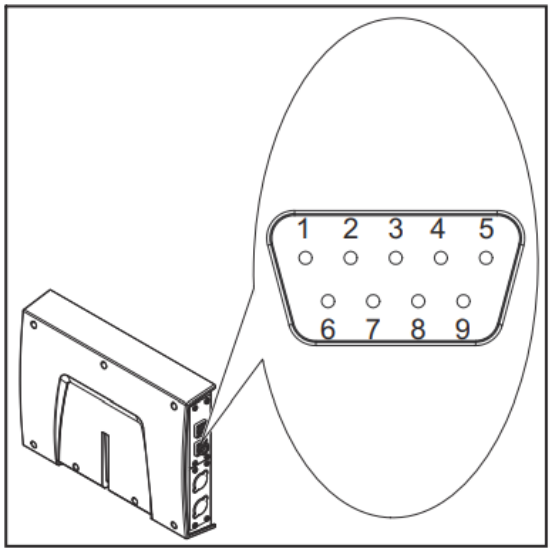
Safety

WARNING!
Danger from incorrect operation and work that is not carried out properly. This can result in serious personal injury and damage to property.

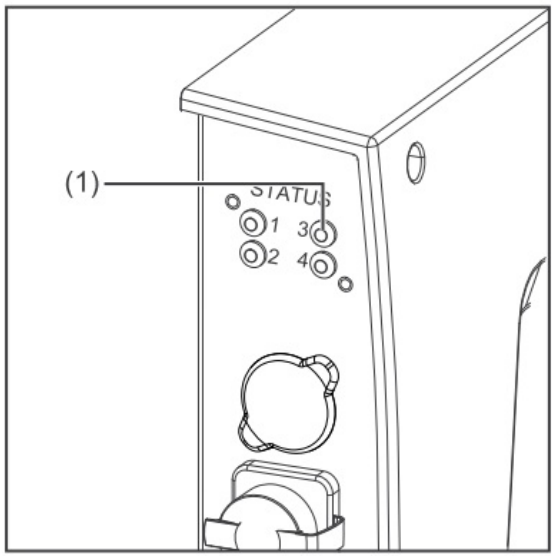
- All the work and functions described in this document must only be carried out by technically trained and qualified personnel.
- Read and understand this document in full.
- Read and understand all safety rules and user documentation for this equip-ment and all system components.

Connections and Indicators

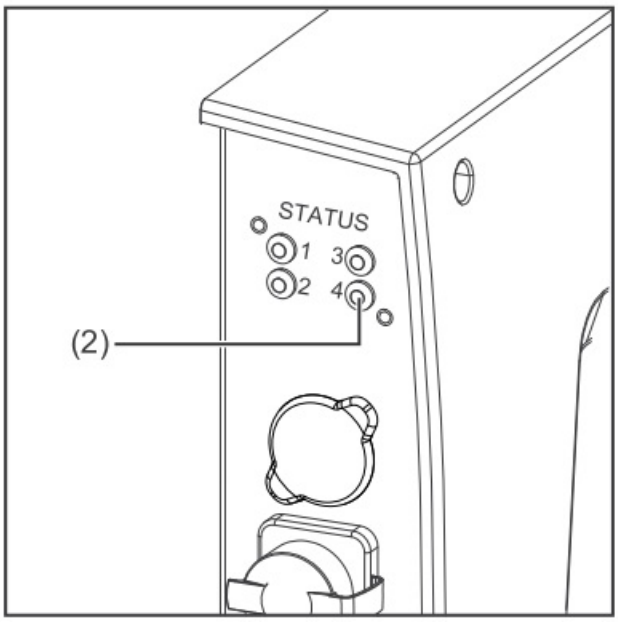
Pin	Signal
1	–
2	CAN_L
3	CAN_GND
4	–
5	CAN_SHD
6	–
7	CAN_H
8	–
9	–
Housing = CAN_SHIELD	



(1) ERR LED – error
Off: No power or device is in working condition
Red, single flash: Warning limit reached A bus error counter has reached or exceeded the limit for a warning
Red, flickering: LSS service running
Red, double flash: Error control event A „Guard-“ or „Heartbeat“ error has occurred
Red: Bus off (Fatal event) No communication (fatal error)



(2) RUN LED – operation
Off: No supply voltage
Green: Module in ‘operational’ status
Green, blinking: Module in ‘pre-operational’ status
Green, one flash: Module in ‘stopped’ status
Green, flickering: Autobaud Baud rate detection in progress
Lights up red: If the Run LED and Error LED light up red, this indicates a serious event that places the interface in an ex-caption state. Contact the service team



Network topology:

- Linear bus, bus termination on both ends (121 Ohm), avoid stub cables

Medium and maximum bus length:

- When selecting cable, plug, and terminating resistors, ISO11898-2 and the CANopen recommendation CiA 303 “Cabling and connector pin assignment” must be observed.

Several stations:

- Max. 64 participants

Transmission speed:

- 1MBit/s, 500 kBit/s, 250 kBit/s, 125 kBit/s, 100 kBits/s, 50 kBits/s, 20 kBits/s, 10 kBits/s

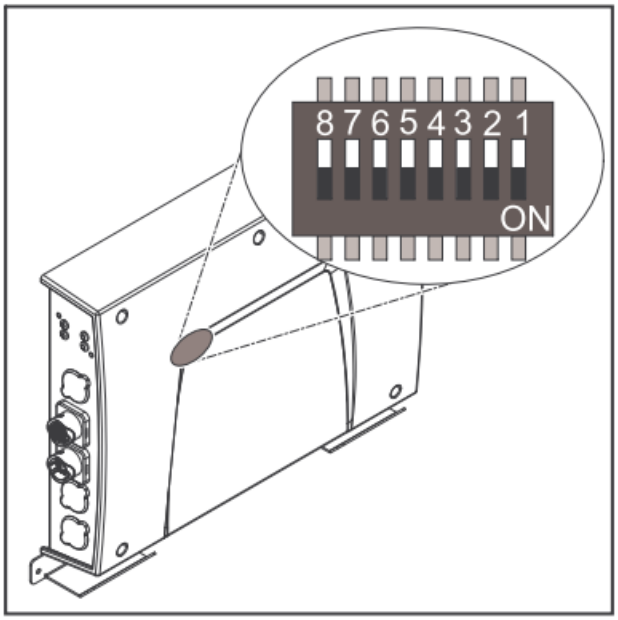
Process data width:

- See section Setting the process data width of the bus module on page 28

Configuration Parameters
In some robot control systems, it may be necessary to state the configuration parameters described here so that the bus module can communicate with the robot.

Parameter	Value	Description
Vendor ID	0000 02C1hex (705dec)	Fronius International GmbH
Product Code	0000 0320hex (800dec)	Fronius FB Pro CANopen
Device name		Fronius-FB-Pro-CANopen

Setting the Bus Module Node Address



You can set the bus module node address as follows:

1. Using the DIP switch in the interface within the range 1 to 63
    - All positions are set to the OFF position at the factory. In this case, the IP address must be set on the website of the welding machine
2. On the website of the welding machine within the range 1 to 126 (if all positions of the DIP switch are set to the OFF position)

Example for setting the node address of the bus module using the DIP switch in the interface:								
Dip switch								**Node address**
8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
–	–	OFF	OFF	OFF	OFF	OFF	ON	1
–	–	OFF	OFF	OFF	OFF	ON	OFF	2
–	–	OFF	OFF	OFF	OFF	ON	ON	3
–	–	ON	ON	ON	ON	ON	OFF	62
–	–	ON	ON	ON	ON	ON	ON	63

The node address is set with positions 1 to 6 of the dip switch. The configuration is carried out in binary format. This results in a configuration range of 1 to 63 in decimal format.

Setting the node address on the website of the welding machine:
Note down the IP address of the welding machine used:

1. On the welding machine control panel, select “Defaults” select “System”
2. On the welding machine control panel, select “Information” Note down the displayed IP address (example: 10.5.72.13)

Access the website of the welding machine in the internet browser: Connect the computer to the network of the welding machine

1. Enter the IP address of the welding machine in the search bar of the internet browser and confirm
2. Enter the standard user name (admin) and password (admin)

The website of the welding machine is displayed Set the bus module node address:

1. On the welding machine website, select the “RI FB PRO/i” tab
2. Enter the desired node address for the interface under “Module configuration”

For example: 2

1. Select “Set configuration” Select “Restart module”
2. The set node address is applied

Set the Process Data Width of the Bus Module
Setting the pro- cess data width of the bus module

- **Note down the IP address of the welding machine used:**

1. On the welding machine control panel, select “Defaults”
2. On the welding machine control panel, select “System”
3. On the welding machine control panel, select “Information”
4. Note down the displayed IP address (example: 10.5.72.13)

Open the website of the welding machine in the internet browser:

1. Connect the computer to the network of the welding machine
2. Enter the IP address of the welding machine in the search bar of the internet browser and confirm
3. Enter the standard user name (admin) and password (admin)
    - The website of the welding machine is displayed

Set the process data width of the bus module:

1. On the welding machine website, select the “RI FB PRO/i” tab
2. Under “Process data”, select the desired process data configuration
3. Select “Save”
    - The field bus connection is restarted and the configuration is applied

Input and output signals

Data types
The following data types are used:

- **UINT16** (Unsigned Integer)
  - The whole number in the range from 0 to 65535
- **SINT16** (Signed Integer)
  - The whole number ranges from -32768 to 32767

Conversion examples:

- for a positive value (SINT16) e. g. desired wire speed x factor 12.3 m/min x 100 = 1230dec = 04CEhex
- for a negative value (SINT16) e.g. arc correction x factor 6.4 x 10 = -64dec = FFC0hex

Availability of input signals
The input signals listed below are available from firmware V2.0.0 of the RI FB PRO/I onwards.

Input signals (from robot to power source)

Address				**Signal**	**Activity/data type**	**Range**	**Factor**	**Process image**	
Relative			**Absolu- te**					**Standard**	**Economy**
WORD	**BYTE**	**BIT**	**BIT**						
	0	0	0	Welding Start	Increa- sing				
		1	1	Robot ready	High				
		2	2	Working mode Bit 0	High	See table Value Range for Working Mode on page 35			
		3	3	Working mode Bit 1	High				
		4	4	Working mode Bit 2	High				
		5	5	Working mode Bit 3	High				
		6	6	Working mode Bit 4	High				

		7	7	—					
0	1	0	8	Gas on	Increa- si ng			ü	ü
		1	9	Wire forward	Increa- si ng				
		2	10	Wire backward	Increa- si ng				
		3	11	Error quit	Increa- si ng				
		4	12	Touch sensing	High				
		5	13	Torch blow out	Increa- si ng				
		6	14	Processing selection Bit 0	High	See table Value ra nge Process li- ne selection on page 36			
		7	15	Processing selection Bit 1	High				

Address				**Signal**	**Activity/d ata type**	**Range**	**Fact or**	**Process i mage**	
Relative			**Absolu- t e**					**Sta nda rd**	**Eco no my**
W OR D	**BY TE**	**BIT**	**BIT**						
		0	16	Welding simulation	High				
				Welding process MIG/MAG: 1) Synchro pulse on	High				

1	2	1	17	*Welding process WIG:* 2) TAC on	High			ü	ü
		2	18	*Welding process WIG:* 2) Cap shaping	High				
		3	19	—					
		4	20	—					
		5	21	Booster manual	High				
		6	22	Wire brake on	High				
		7	23	Torchbody Xchange	High				
	3	0	24	—					
		1	25	Teach mode	High				
		2	26	—					
		3	27	—					
		4	28	—					
		5	29	Wire since start	Increa- si ng				
		6	30	Wire sense break	Increa- si ng				
		7	31	—					

Address					**Process i mage**

Relative			Absolu- te	Signal	Activity/data type	Range	Factor	Standard	Economy
WORD	BYTE	BIT	BIT						
2	4	0	32	TWIN mode Bit 0	High	See table Value Range for TWIN Mode on page 36		ü	ü
		1	33	TWIN mode Bit 1	High				
		2	34	—					
		3	35	—					
		4	36	—					
		5	37	Documentation mode	High	See table Value Range for Docu- mentation Mode on page 36			
		6	38	—					
		7	39	—					
	5	0	40	—					
		1	41	—					
		2	42	—					
		3	43	—					
		4	44	—					
		5	45	—					
		6	46	—					

		7	47	Disable process-controlled correction	High				

Address				Signal	Activity/data type	Range	Factor	Process image	
Relative			Absolute					Standard	Economy
WORD	BYTE	BIT	BIT						
3	6	0	48	—				ü	ü
		1	49	—					
		2	50	—					
		3	51	—					
		4	52	—					
		5	53	—					
		6	54	—					
		7	55	—					
	7	0	56	ExtInput1 => OPT_Output 1	High				
		1	57	ExtInput2 => OPT_Output 2	High				
		2	58	ExtInput3 => OPT_Output 3	High				
		3	59	ExtInput4 => OPT_Output 4	High				
		4	60	ExtInput5 => OPT_Output 5	High				

	7	5	61	ExtInput6 => OPT_Output 6	High				
		6	62	ExtInput7 => OPT_Output 7	High				
		7	63	ExtInput8 => OPT_Output 8	High				
4	8-9	0–7	64–79	Welding characteristic- / Job number	UINT16	0 to 1000	1	ü	ü
5	10 – 11	0-7	80-95	*Welding process MIG/MAG:* 1) *Constant Wire:* Wire feed speed command value	SINT16	-327,68 to 327,67 [m/min]	100	ü	ü
				Welding process WIG: 2) Main- / Hotwire current command value	UINT16	0 to 6553,5 [A]	10		
				For job-mode: Power correction	SINT16	-20,00 to 20,00 [%]	100		

Address				**Signal**	**Activity/data type**	**Range**	**Factor**	**Process image**	
Relative			**Absolu- te**					**Standard**	**Economy**
WORD	**BYTE**	**BIT**	**BIT**						

6	12 – 13	0-7	96-111	*Welding process MIG/MAG:* 1) Arclength correction	SINT16	-10,0 to 10,0 [Schritte]	10	ü	ü
				Welding process *MIG/MAG Standard-Manuel:* Welding voltage	UINT16	0,0 to 6553,5 [V]	10		
				Welding process WIG: 2) Wire feed speed command value	SINT16	-327,68 to 327,67 [m/min]	100		
				For job-mode: Arclength correction	SINT16	-10,0 to 10,0 [Schritte]	10		
				Welding process Constant Wire: Hotwire current	UINT16	0,0 to 6553,5 [A]	10		
7	14 – 15	0-7	112-127	*Welding process MIG/MAG:* 1) Pulse-/dynamic correction	SINT16	-10,0 to 10,0 [steps]	10	ü	ü
				Welding process *MIG/MAG Standard-Manuel:* Dynamic	UINT16	0,0 to 10,0 [steps]	10		

				Welding process WIG: 2) Wire correction	SINT16	-10,0 to 10,0 [steps]	10		
8	16 – 17	0-7	128-143	*Welding process MIG/MAG:* 1) Wire retract correction	UINT16	0,0 to 10,0 [steps]	10	ü	
				Welding process WIG: 2) Wire retract end	UINT16	OFF, 1 to 50 [mm]	1		
9	18 – 19	0-7	144-159	Welding speed	UINT16	0,0 to 1000,0 [cm/min]	10	ü	

Address				**Signal**	**Activity/data type**	**Range**	**Factor**	**Process image**	
Relative			**Absolu- te**					**Standard**	**Economy**
WORD	**BYTE**	**BIT**	**BIT**						
10	20 – 21	0-7	160-175	Process controlled correction		See table **Value range for Process controlled correction** on page **36**		ü	
11	22 – 23	0-7	176-191	*Welding process WIG:* 2) Wire positioning start				ü	

12	24 – 25	0-7	192-207	—				ü	
13	26 – 27	0-7	208-223	—				ü	
14	28 – 29	0-7	224-239	—				ü	
15	30 – 31	0-7	240-255	Wire forward / backward length	UINT16	OFF / 1 to 65535 [mm]	1	ü	
16	32 – 33	0-7	256-271	Wire sense edge detection	UINT16	OFF / 0,5 to 20,0 [mm]	10	ü	
17	34 – 35	0-7	272-287	—				ü	
18	36 – 37	0-7	288-303	—				ü	
19	38 – 39	0-7	304-319	Seam number	UINT16	0 to 65535	1	ü	

1. MIG/MAG Puls-Synergic, MIG/MAG Standard-Synergic, MIG/MAG Stan-dard-Manuel, MIG/MAG PMC, MIG/MAG, LSC
2. WIG cold wire, WIG hotwire

Value Range for Working Mode

Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Description
0	0	0	0	0	Internal parameter selection
0	0	0	0	1	Special 2-step mode characteristics
0	0	0	1	0	Job mode

Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Description
0	1	0	0	0	2-step mode characteristics
0	1	0	0	1	2-step MIG/MAG standard manual
1	0	0	0	0	Idle Mode
1	0	0	0	1	Stop coolant pump
1	1	0	0	1	R/L-Measurement

Value Range for Documentation Mode

Bit 0	Description
0	Seam number of welding machine (internal)
1	Seam number of robots (Word 19)

The value range for Process control- led correction

Process	Signal	Activity/data type	Value range configuration range	Unit	Factor
PMC	Arc length stabilizer	SINT16	-327.8 to +327.7 0.0 to +5.0	Volts	10

The value range for process-dependent correction

Process	Signal	Activity/data type	Value range configuration range	Unit	Factor
PMC	Arc length stabilizer	SINT16	-327.8 to +327.7 0.0 to +5.0	Volts	10

Value range for process-dependent correction

Value range Pro- cess line selection

Bit 1	Bit 0	Description
0	0	Process line 1 (default)
0	1	Process line 2
1	0	Process line 3
1	1	Reserved

Value range for process line selection

Value Range for TWIN Mode

Bit 1	Bit 0	Description
0	0	TWIN Single mode
0	1	TWIN Lead mode
1	0	TWIN Trail mode
1	1	Reserved

Value range for TWIN mode

Availability of the output signals
The output signals listed below are available from firmware V2.0.0 of the RI FB PRO/i onwards.

Output Signals (from Power Source to Robot)

Address				Signal	Activity / data type	Range	Factor	Process image	
relative			absolute						
WORD	BYTE	BIT	BIT					Standard	Economy
0	0	0	0	Heartbeat Powersource	High/Low	1 Hz		ü	ü
		1	1	Power source ready	High				
		2	2	Warning	High				
		3	3	Process active	High				
		4	4	Current flow	High				
		5	5	Arc stable- / touch signal	High				
		6	6	Main current signal	High				
		7	7	Touch signal	High				
	1	0	8	Collision box active	High	0 = collision - on or cable break			
		1	9	Robot Motion Release	High				
		2	10	Wire stick workpiece	High				
		3	11	—					
		4	12	Short circuit contact tip	High				
		5	13	Parameter selection eternally	High				
		6	14	Characteristic number valid	High				

		7	15	Torch body gripped	High				

Address				Signal	Activity / data type	Range	Factor	Process image	
relative			absolute						
WORD	BYTE	BIT	BIT					Standard	Economy
		0	16	Command value out of range	High				
		1	17	Correction out of range	High				
		2	18	—					
		3	19	Limitsignal	High				
		4	20	—					
	2	5	21	—					
		6	22	Main supply status	Low				
		7	23	—					
		0	24	Sensor status 1	High	See table Assign- ment of Sensor Sta- uses 1–4 on page 40			
		1	25	Sensor status 2	High				
		2	26	Sensor status 3	High				
1		3	27	Sensor status 4	High			ü	ü
		4	28	—					
	3	5	29	—					

		6	30	—					
		7	31	—					
2	4	0	32	—				ü	ü
		1	33	—					
		2	34	—					
		3	35	Safety status Bit 0	High	See table **Value ran- g e Safety status** on page **41**			
		4	36	Safety status Bit 1	High				
		5	37	—					
		6	38	Notification	High				
		7	39	System not ready	High				
	5	0	40	—					
		1	41	—					
		2	42	—					
		3	43	—					
		4	44	—					
		5	45	—					
		6	46	—					
		7	47	—					

Address					**Process i mage**

relative			absolute	Signal	Activity / data type	Range	Factor	Standard	Economy
WORD	BYTE	BIT	BIT						
3	6	0	48	Process Bit 0	High	See table **Value Range for Process Bit** on page **41**		ü	ü
		1	49	Process Bit 1	High				
		2	50	Process Bit 2	High				
		3	51	Process Bit 3	High				
		4	52	Process Bit 4	High				
		5	53	—					
		6	54	Touch signal gas nozzle	High				
		7	55	TWIN synchronization active	High				
	7	0	56	ExtOutput1 <= OPT_In- put1	High				
		1	57	ExtOutput2 <= OPT_In- put2	High				
		2	58	ExtOutput3 <= OPT_In- put3	High				
		3	59	ExtOutput4 <= OPT_In- put4	High				
		4	60	ExtOutput5 <= OPT_In- put5	High				
		5	61	ExtOutput6 <= OPT_In- put6	High				
		6	62	ExtOutput7 <= OPT_In- put7	High				
		7	63	ExtOutput8 <= OPT_In- put8	High				

4	8-9	0-7	64-79	Welding voltage	UINT16	0.0 to 655.35 [V]	100	ü	ü
5	10 – 11	0-7	80-95	Welding current	UINT16	0.0 to 6553.5 [A]	10	ü	ü
6	12 – 13	0-7	96-111	Wire feed speed	SINT16	-327.68 to 327.67 [m/min]	100	ü	ü
7	14 – 15	0-7	112-127	Actual real value for seam tracking	UINT16	0 to 6.5535	10000	ü	ü
8	16 – 17	0-7	128-143	Error number	UINT16	0 to 65535	1	ü	
9	18 – 19	0-7	144-159	Warning number	UINT16	0 to 65535	1	ü	

Address				**Signal**	**Activity / data type**	**Range**	**Factor**	**Process image**	
relative			**absolute**						
WORD	**BYTE**	**BIT**	**BIT**					**Standard**	**Economy**
10	20 – 21	0-7	160-175	Motor current M1	SINT16	-327.68 to 327.67 [A]	100	ü	

11	22 – 23	0-7	176-191	Motor current M2	SINT16	-327.68 to 327.67 [A]	100	ü	
12	24 – 25	0-7	192-207	Motor current M3	SINT16	-327.68 to 327.67 [A]	100	ü	
13	26 – 27	0-7	208-223	—				ü	
14	28 – 29	0-7	224-239	—				ü	
15	30 – 31	0-7	240-255	—				ü	
16	32 – 33	0-7	256-271	Wire position	SINT16	-327.68 to 327.67 [mm]	100	ü	
17	34 – 35	0-7	272-287	—				ü	
18	36 – 37	0-7	288-303	—				ü	
19	38 – 39	0-7	304-319	—				ü	

Assignment of Sensor Statuses 1–4

Signal	Description
Sensor status 1	OPT/i WF R wire end (4,100,869)
Sensor status 2	OPT/i WF R wire drum (4,100,879)
Sensor status 3	OPT/i WF R ring sensor (4,100,878)
Sensor status 4	Wire buffer set CMT TPS/i (4,001,763)

Value range Safety status

Bit 1	Bit 0	Description
0	0	Reserve
0	1	Hold
1	0	Stop
1	1	Not installed / active

Value range Safety status

Value Range for Process Bit

Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Description
0	0	0	0	0	No internal parameter selection or process
0	0	0	0	1	MIG/MAG pulse synergic
0	0	0	1	0	MIG/MAG standard synergic
0	0	0	1	1	MIG/MAG PMC
0	0	1	0	0	MIG/MAG LSC
0	0	1	0	1	MIG/MAG standard manual
0	0	1	1	0	Electrode
0	0	1	1	1	TIG
0	1	0	0	0	CMT
0	1	0	0	1	Constantine
0	1	0	1	0	ColdWire
0	1	0	1	1	DynamicWire

Value Range for Process Bit

Bit 1	Bit 0	Description
0	0	Inactive
0	1	Idle
1	0	Finished
1	1	Error

Value Range for Function Status

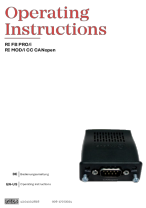
- spareparts.fronius.com
- At www.fronius.com/contact you will find the contact details of all Fronius subsidiaries and Sales & Service Partners.

Frequently Asked Questions

Q: How many stations can be connected to the bus module?
A: The maximum number of stations that can be connected is 64 participants.

Q: What should I do if the LED indicators show specific colors?
A: Different LED colors indicate various system statuses. For example, a red LED could signify a critical error or communication failure. Refer to the manual for detailed troubleshooting steps.

Documents / Resources

	Fronius RI FB PRO Setting The Bus Module [pdf] Instruction Manual 42, 0410, 2656, RI FB PRO Setting The Bus Module, RI FB PRO, Setting The Bus Module, Bus Module, Module

References

- Fronius Spare Parts
- User Manual