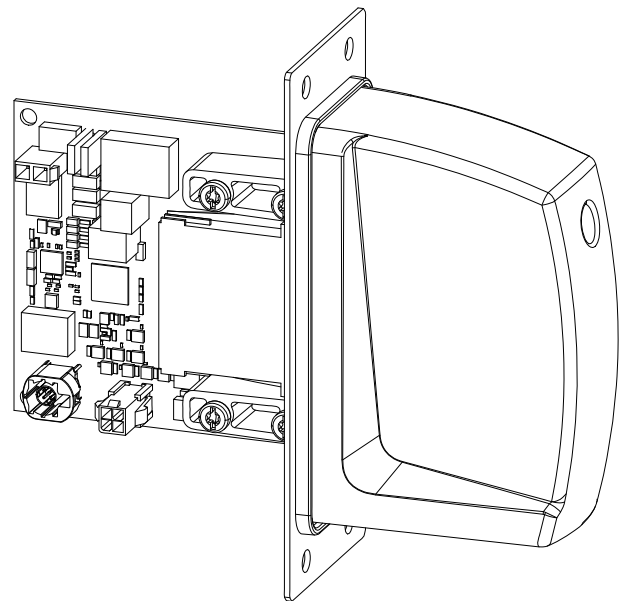


# Operating Instructions

**RI FB/i FANUC 1.0**

**RI MOD/i CC-M40 Ethernet/IP - 2P**



**EN-US** | Operating instructions



42,0426,0223,EA

024-23062025



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# General

## Safety



### WARNING!

#### **Danger from incorrect operation and work that is not carried out properly.**

Serious injury and damage to property may result.

- ▶ All the work and functions described in this document must only be carried out by trained and qualified personnel.
- ▶ Read and understand this document.
- ▶ Read and understand all the Operating Instructions for the system components, especially the safety rules.



### WARNING!

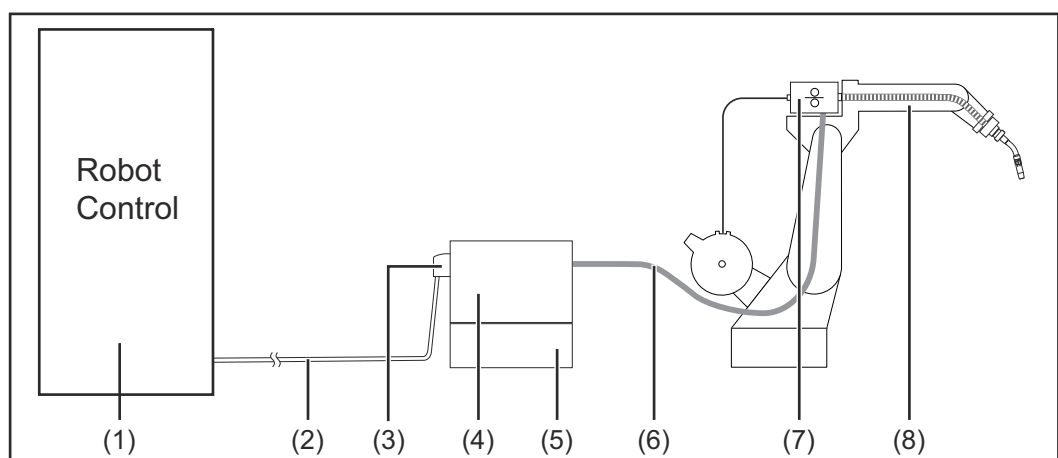
#### **Danger from unplanned signal transmission.**

Serious injury and damage to property may result.

- ▶ Do not transfer safety signals via the interface.

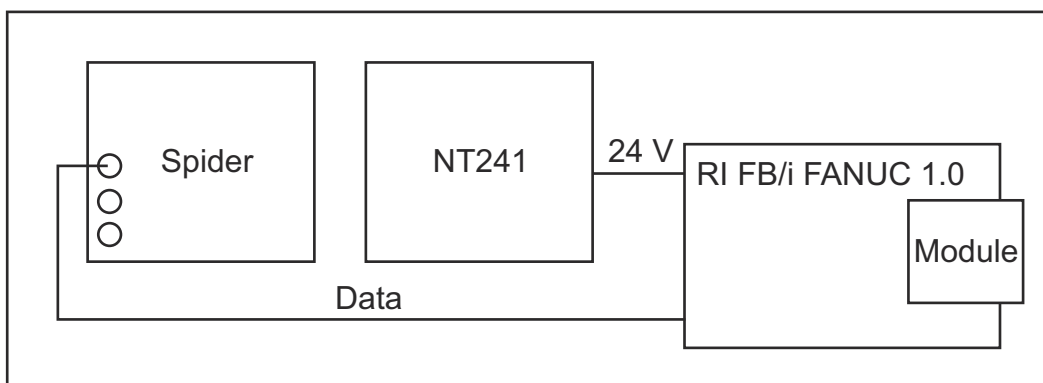
## Device Concept

The robot interface serves as an interface between the welding machine and standardized bus modules supporting a wide range of communication protocols. Fronius may factory-fit the robot interface in the welding machine but it can also be retrofitted by appropriately trained and qualified personnel.

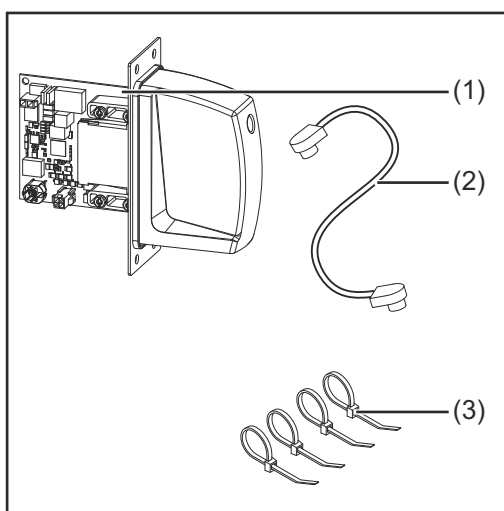


- |     |                          |
|-----|--------------------------|
| (1) | Robot control system     |
| (2) | SpeedNet data cable      |
| (3) | Robot interface          |
| (4) | Welding machine          |
| (5) | Cooling unit             |
| (6) | Interconnecting hosepack |
| (7) | Wirefeeder               |
| (8) | Robot                    |

## Block Diagram



## Scope of Supply



- |     |  |
|-----|--|
| (1) | RI FB/i FANUC 1.0                              |
| (2) | Data cable<br>4-pin                            |
| (3) | Cable ties                                     |
| (4) | These Operating Instructions<br>(not pictured) |

## Required Tools and Materials

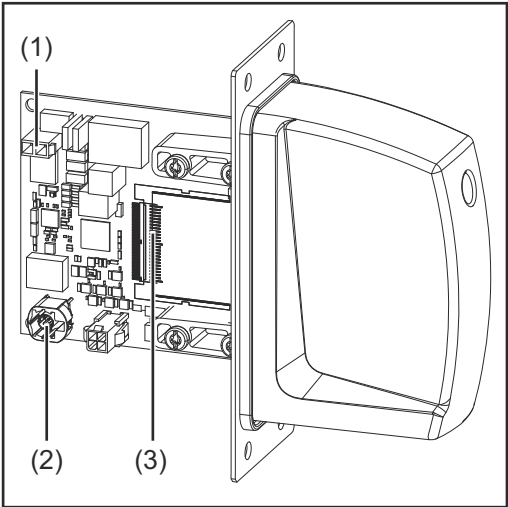
- Screwdriver TX8
- Screwdriver TX20
- Screwdriver TX25
- Diagonal cutting pliers

## Installation Requirements

The robot interface may only be installed in the designated opening on the rear of the welding machine.

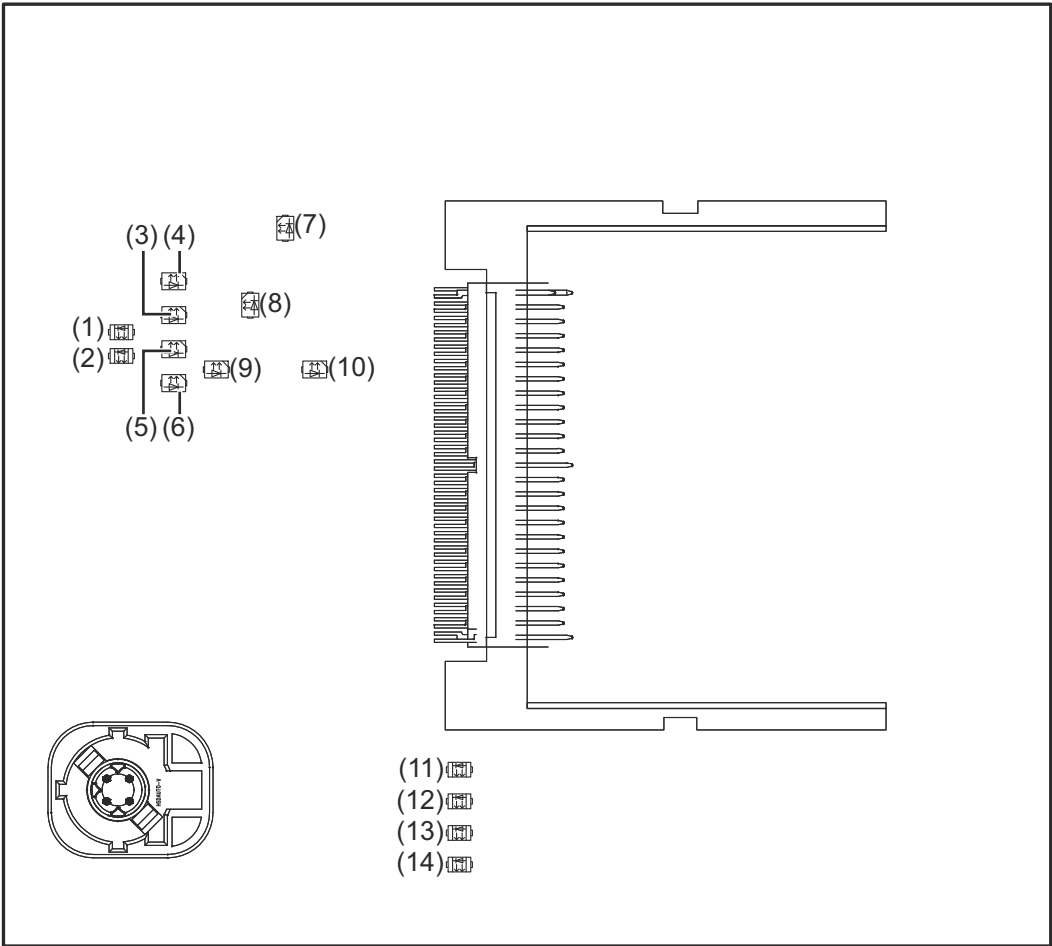
# Connections and Indicators

## Connections on the Robot Interface



- |     |   |
|-----|---|
| (1) | Power supply connection<br>2-pin        |
| (2) | SpeedNet data cable connection<br>4-pin |
| (3) | Bus module connection                   |

## LEDs on Robot Interface PCB



(1)	ETH1 LED	Green	For diagnosing the network connection. For details, see section below titled "LEDs for Network Connection Diagnosis"
(2)	ETH2 LED	Orange	

(3)	LED 3	Green	No function
(4)	LED 4	Green	
(5)	LED 5	Green	<ul style="list-style-type: none"> <li>- Flashes at 4 Hz = No SpeedNet connection</li> <li>- Flashes at 20 Hz = Establishing SpeedNet connection</li> <li>- Flashes at 1 Hz = SpeedNet connection established</li> </ul>
(6)	LED 6	Red	Lights up when an internal error occurs. Remedy: Restart the robot interface. If this does not resolve the issue, inform the service team.
(7)	+3V3 LED	Green	For diagnosing the power supply. For details, see section below titled "LEDs for Power Supply Diagnosis"
(8)	+24V LED	Green	
(9)	DIG OUT 2 LED	Green	Digital output 2. LED lights up when active
(10)	DIG OUT 1 LED	Green	Digital output 1. LED lights up when active
(11)	LED 11	Green	No function
(12)	LED 12	Green	
(13)	LED 13	Green	
(14)	LED 14	Green	

#### LEDs for Power Supply Diagnosis

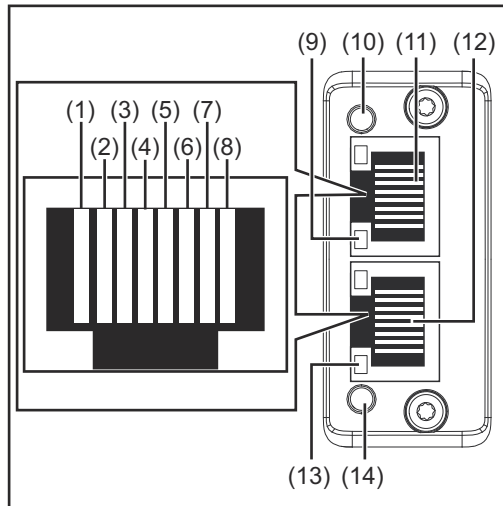
LED	Indicator	Meaning	Cause
+24V	Off	No supply voltage available for interface	<ul style="list-style-type: none"> <li>- Robot interface power supply not established</li> <li>- Power supply cable faulty</li> </ul>
	Lights up	24 VDC supply voltage present on robot interface	
+3V3	Off	No operating voltage present on robot interface	<ul style="list-style-type: none"> <li>- 24 VDC supply voltage not present</li> <li>- Robot interface power supply unit is faulty</li> </ul>
	Lights up	3 VDC operating voltage present on robot interface	

**LEDs for Network Connection Diagnosis**

LED	Indicator	Meaning	Cause
ETH1	Off	No network connection	<ul style="list-style-type: none"> <li>- No network connection established for interface</li> <li>- Network cable faulty</li> </ul>
	Lights up	Network connection established	
	Flashes	Data transfer in progress	
ETH2	Off	Transmission speed 10 Mbit/s	
	Lights up	Transmission speed 100 Mbit/s	



## Connections and Indicators on RJ 45 module



(1)	TX+
(2)	TX-
(3)	RX+
(4), (5)	Not normally used; to ensure signal completeness, these pins must be interconnected and, after passing through a filter circuit, must terminate at the ground conductor (PE).
(6)	RX-
(7), (8)	Not normally used; to ensure signal completeness, these pins must be interconnected and, after passing through a filter circuit, must terminate at the ground conductor (PE).

(9)	Connection/activity at connection 2 LED
(10)	MS LED (module status)
(11)	RJ-45 Ethernet connection 2
(12)	RJ-45 Ethernet connection 1
(13)	Connection/activity at connection 1 LED
(14)	NS LED (network status)

### NS LED (Network Status)

Status	Meaning
Off	No supply voltage or no IP address
Lights up green	Online, one or more connections established (CIP category 1 or 3)
Flashes green	Online, no connections established
Lights up red	Double IP address, serious error
Flashes red	Overrun of time for one or more connections (CIP category 1 or 3)

### MS LED (Module Status)

Status	Meaning
Off	No supply voltage
Lights up green	Controlled by a Scanner in Run state and, if CIP Sync is enabled, time is synchronized to a Grandmaster clock
Flashes green	Not configured, Scanner in Idle state, or, if CIP Sync is enabled, time is synchronized Grandmaster clock
Lights up red	Major error - exception state, serious fault, etc.

**MS LED (Module Status)**

Flashes red	Correctable error - the module is configured, but there is a difference between the parameters stored and the parameters used (configuration process image, IP address)
-------------	---

**Connection/Activity LED**

Status	Meaning
Off	No connection, no activity
Lights up green	Connection established (100 Mbit/s)
Flickers green	Activity (100 Mbit/s)
Lights up yellow	Connection established (10 Mbit/s)
Flickers yellow	Activity (10 Mbit/s)

# Technical data

## Environmental Conditions



### CAUTION!

#### A risk is posed by prohibited environmental conditions.

This can result in severe damage to equipment.

- Only store and operate the device under the following environmental conditions.

Temperature range of ambient air:

- During operation: -10 °C to +40 °C (14 °F to 104 °F)
- During transport and storage: -20 °C to +55 °C (-4 °F to 131 °F)

Relative humidity:

- Up to 50% at 40 °C (104 °F)
- Up to 90% at 20 °C (68 °F)

Ambient air: free of dust, acids, corrosive gases or substances, etc.

Altitude above sea level: up to 2000 m (6500 ft).

## Robot Interface Technical Data

Power supply	Internal (24 V)
Degree of protection	IP 23

## Data Transfer Properties

### RJ-45 Connection

#### Transmission technology:

Ethernet

#### Medium (4 x 2 twisted-pair copper cable):

Category 3 (10 Mbit/s)

Category 5 (100 Mbit/s)

When selecting the cables, plugs, and termination resistances, the ODVA recommendation for the planning and installation of EtherNet/IP systems must be observed.

The EMC tests were carried out by the manufacturer with the cable IE-C5ES8VG0030M40M40-F.

#### Transmission speed:

10 Mbit/s or 100 Mbit/s

#### Bus connection:

RJ-45 Ethernet

## Configuration Parameters

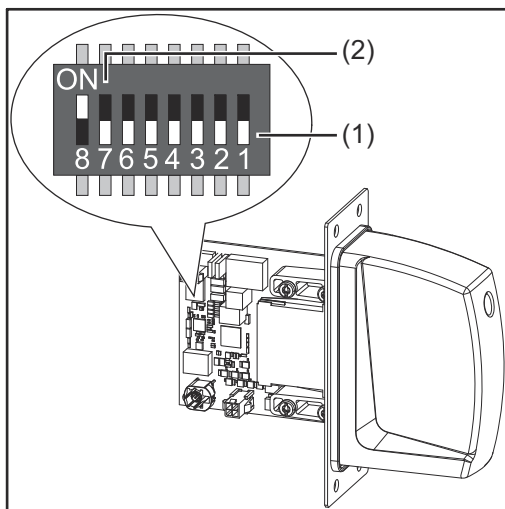
In some robot control systems, it may be necessary to state the configuration parameters described here so that the bus module can communicate with the robot.

Parameter	Value
Vendor ID	534 <sub>hex</sub> (1332 <sub>dec</sub> )
Device Type	C <sub>hex</sub> (12 <sub>dec</sub> )
Product Code	321 <sub>hex</sub> (801 <sub>dec</sub> )

Image Type	Instance Type	Instance Name	Instance Description	Instance Number	Size [Byte]
Standard Image	Producing Instance	Input Data Standard	Data from welding machine to robot	100	40
	Consuming Instance	Output Data Standard	Data from robot to welding machine	150	40
Economy Image	Producing Instance	Input Data Standard	Data from welding machine to robot	101	16
	Consuming Instance	Output Data Standard	Data from robot to welding machine	151	16
AM Basic 1.0 Image	Producing Instance	Input Data Standard	Data from welding machine to robot	103	60
	Consuming Instance	Output Data Standard	Data from robot to welding machine	153	60

# Configuration of robot interface

## General



The DIP switch on the robot interface is used to configure:

- The process image (standard image)
- The IP address

Default setting for process image:  
Positions 7 and 8 of DIP switch set to OFF (1) = standard image = RI FB/i FANUC 1.0

Default setting for IP address = 192.168.0.2:

- Positions 6, 5, 4, 3, 1 of DIP switch set to OFF (1)
- Position 2 of DIP switch set to ON (2)

## Configuring the Process Image

DIP Switch								Configuration
8	7	6	5	4	3	2	1	
OFF	OFF	-	-	-	-	-	-	Standard-Image (FANUC 1.0)
OFF	ON	-	-	-	-	-	-	Not used
ON	OFF	-	-	-	-	-	-	Not used
ON	ON	-	-	-	-	-	-	Not used

The process image defines the volume of data transferred and the system compatibility.

## Setting the IP Address

You can set the IP address as follows:

- Via the DIP switches within the range defined by 192.168.0.xxx (xx = DIP switch setting = 0 to 63)

Setting the Address via the DIP Switches:								
DIP switch								IP address
8	7	6	5	4	3	2	1	
-	-	OFF	OFF	OFF	OFF	OFF	ON	192.168.0.1
-	-	OFF	OFF	OFF	OFF	ON	OFF	192.168.0.2
								:
-	-	ON	ON	OFF	ON	ON	OFF	192.168.0.54
-	-	ON	ON	OFF	ON	ON	ON	192.168.0.55

The IP address can be set via positions 1 to 6 of the DIP switch.  
The configuration is carried out in binary format. In decimal format, the setting range is 0 through 63.

The following IP address is set via the DIP switches on delivery:

- IP address: 192.168.0.2
- Subnet mask: 255.255.255.0
- Default gateway: 0.0.0.0

---

## Configuring the Robot Interface

- 1** Set the DIP switch in accordance with the desired configuration

### NOTE!

#### **Risk due to invalid DIP switch settings.**

This may result in malfunctions.

- ▶ Whenever changes are made to the DIP switch settings, the interface must be restarted. This is the only way for the changes to take effect.
- ▶ Restart the interface = interrupting and restoring the power supply or executing the relevant function on the website of the welding machine (SmartManager).

# Installing the Robot Interface

## Safety

### **WARNING!**

#### **Danger from electrical current.**

Serious personal injuries may result.

- ▶ Before starting work, switch off all the devices and components involved and disconnect them from the grid.
- ▶ Secure all devices and components involved so they cannot be switched back on.
- ▶ After opening the device, use a suitable measuring instrument to check that electrically charged components (such as capacitors) have been discharged.

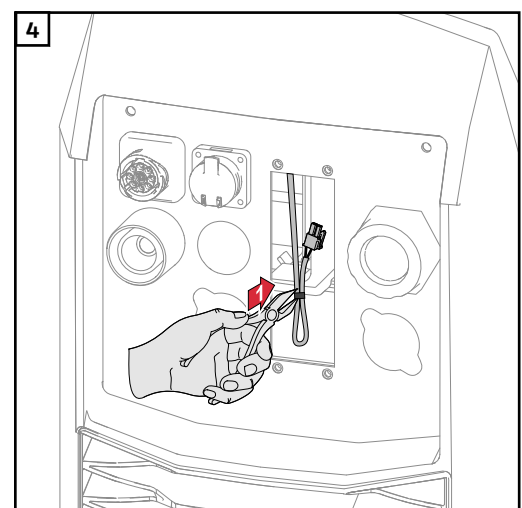
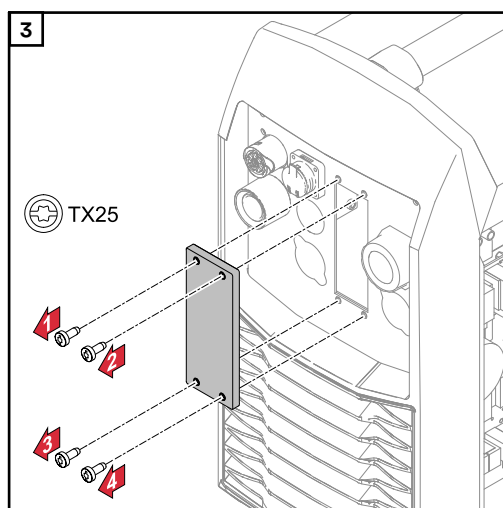
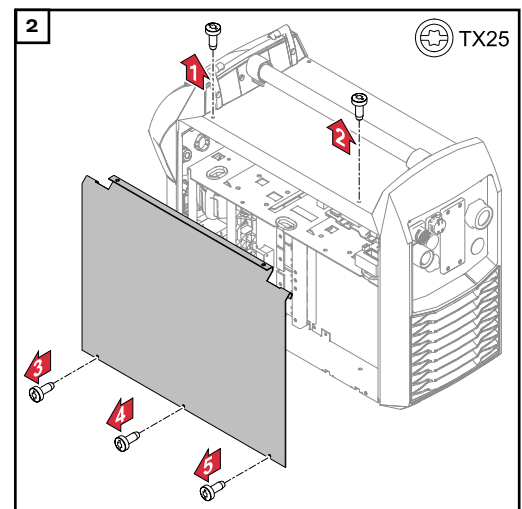
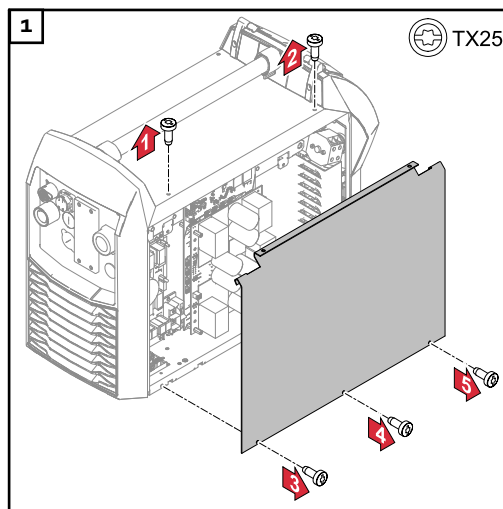
### **WARNING!**

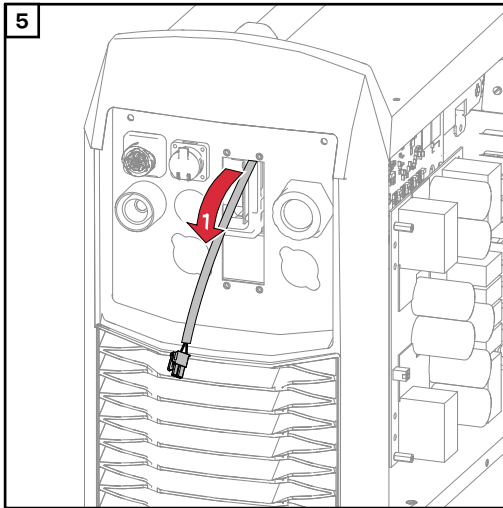
#### **Danger from electrical current due to inadequate ground conductor connection.**

This can result in serious personal injury and damage to property.

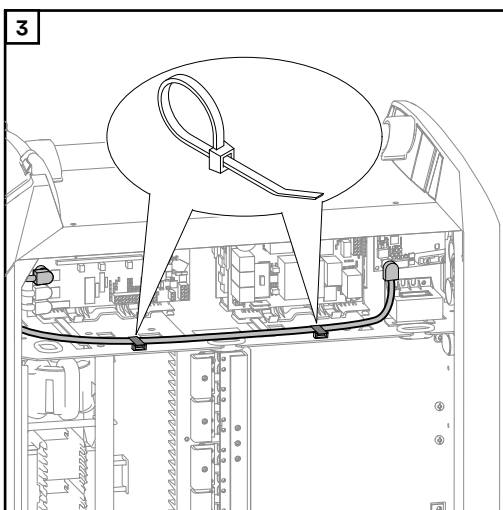
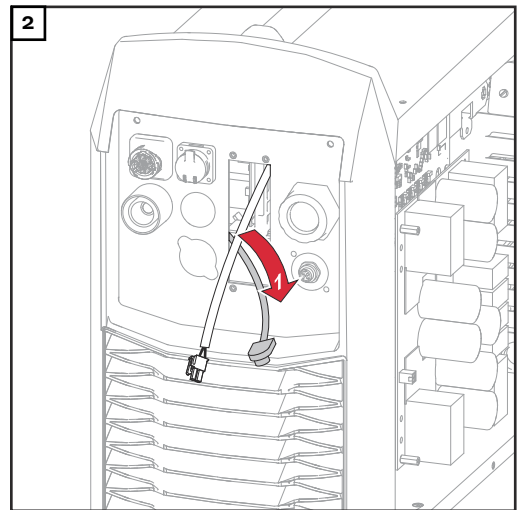
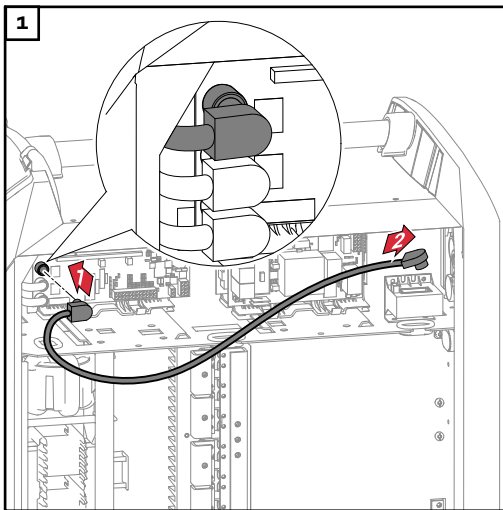
- ▶ Always use the original housing screws in the quantity initially supplied.

## Preparation



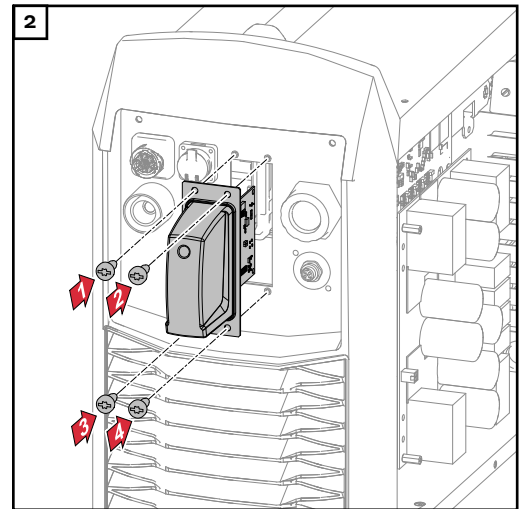
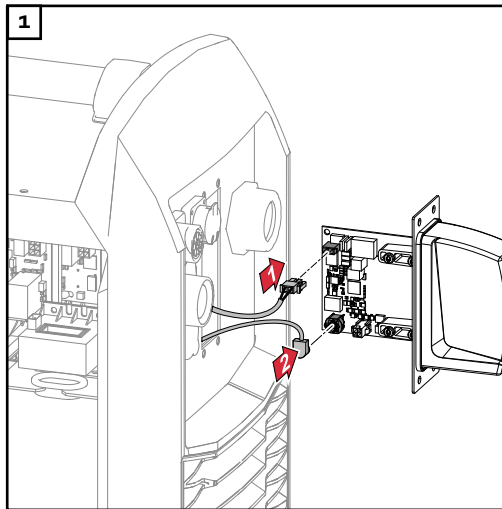


## Routing the Data Cable

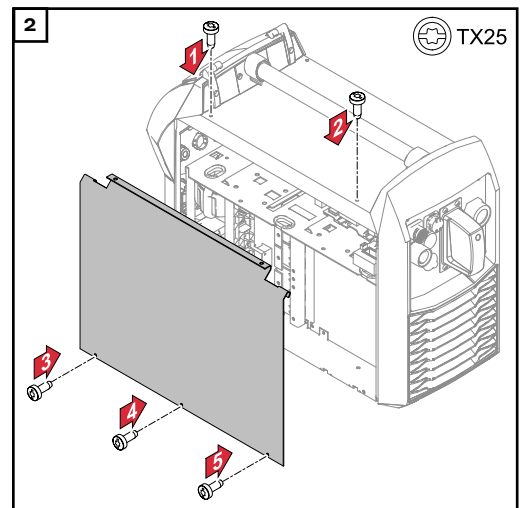
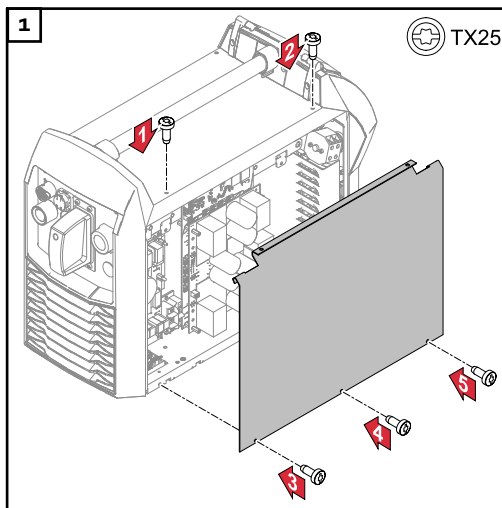




## Installing the Robot Interface



## Final Tasks



# Installing the Bus Module

## Safety



### WARNING!

#### **Danger from electrical current.**

Serious injuries or death may result.

- Before starting work, switch off all devices and components involved, and disconnect them from the grid.
- Secure all devices and components involved so that they cannot be switched back on.



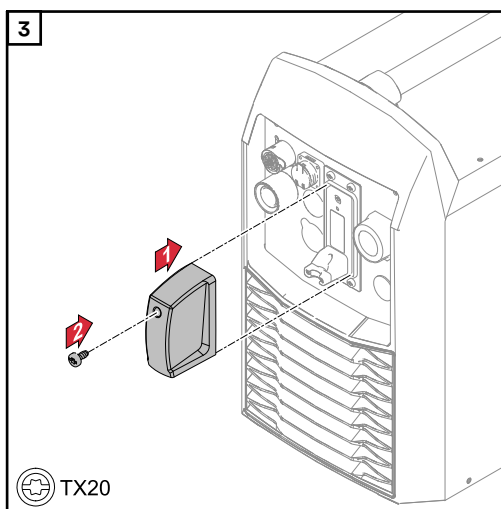
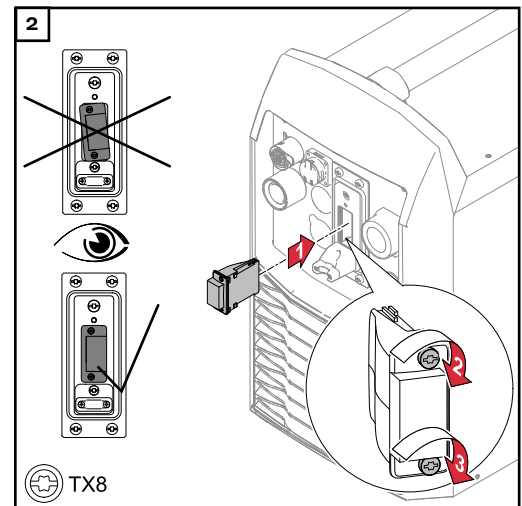
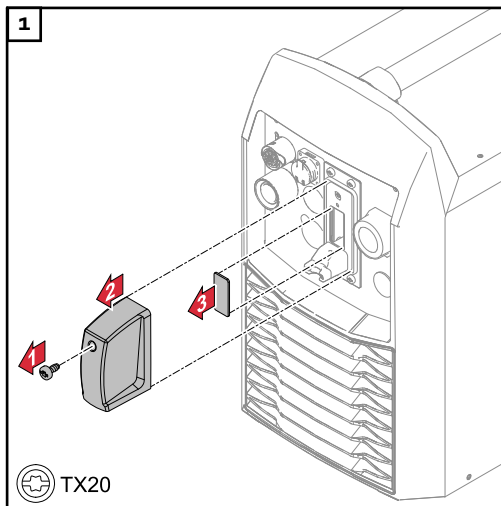
### WARNING!

#### **Danger from electrical current due to inadequate ground conductor connection.**

Serious personal injury and property damage may result.

- Always use the original housing screws in the quantity initially supplied.

## Installing the Bus Module



# Input and Output Signals Standard Image FA-NUC 1.0

---

## Data types

The following data types are used:

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

### Conversion examples:

- for a positive value (SINT16)  
e.g. desired wire speed x factor  
 $12.3 \text{ m/min} \times 100 = 1230_{\text{dec}} = 04\text{CE}_{\text{hex}}$
- for a negative value (SINT16)  
e.g. arc correction x factor  
 $-6.4 \times 10 = -64_{\text{dec}} = \text{FFCO}_{\text{hex}}$

---

## Availability of input signals

The input signals listed below are available from firmware V4.3.0 of the TPS/i welding machine.

---

## Input signals (from robot to welding machine)

Adresse				Signal	Beschreibung	Aktivität / Datentyp	Bereich	Faktor
relativ			absolut					
WORD	BYTE	BIT	BIT					
0	0	0	1	Welding Start		increasing		
		1	2	Robot ready		High		
		2	3	Working mode Bit 0		High	See table Value range for Working mode on page 29	
		3	4	Working mode Bit 1		High		
		4	5	Working mode Bit 2		High		
		5	6	Working mode Bit 3		High		
		6	7	Working mode Bit 4		High		
		7	8	—				
	1	0	9	Gas on		increasing		
		1	10	Wire forward		increasing		
		2	11	Wire backward		increasing		
		3	12	Error quit		increasing		
		4	13	Touch sensing		increasing		
		5	14	Torch blow out		increasing		
		6	15	Processline selection Bit 0		High	See table Value range Process line selection on page 29	
		7	16	Processline selection Bit 1		High		

Adresse				Signal	Beschreibung	Aktivität / Datentyp	Bereich	Faktor	
relativ			absolut						
WORD	BYTE	BIT	BIT						
1	2	0	17	Welding Simulation		High			
		1	18	Welding process MIG/MAG: <sup>1)</sup> Constant Wire:		High			
				Synchro pulse on					
				Welding process TIG: <sup>2)</sup> TAC on		High			
		2	19	Welding process MIG/MAG: <sup>1)</sup> Constant Wire:		High			
				SFI on					
				Welding process TIG: <sup>2)</sup> Cap shaping					
		3	20	—					
		4	21	Welding process TIG: <sup>2)</sup> Pilot arc on		High			
		5	22	Booster manuel		High			
		6	23	Welding process MIG/MAG: <sup>1)</sup> Constant Wire:		High			
				Wire brake on					
				Welding process TIG: <sup>2)</sup> Cold wire disable		High			
		7	24	Torchbody xchange		High			
	3	0	25	—					
		1	26	Teach mode		High			
		2	27	—					
		3	28	—					
		4	29	—					
		5	30	Wire sense start		increas- ing			
		6	31	Wire sense break		increas- ing			
		7	32	—					

Adresse				Signal	Beschreibung	Aktivität / Datentyp	Bereich		Faktor
relativ			absolut						
WORD	BYTE	BIT	BIT						
2	4	0	33	Welding process MIG/MAG: <sup>1)</sup> Constant Wire:  TWIN mode Bit 0		High	See table <a href="#">Value Range for TWIN Mode on page 29</a>		
		1	34	Welding process MIG/MAG: <sup>1)</sup> Constant Wire:  TWIN mode Bit 1		High			
		2	35	—					
		3	36	—					
		4	37	—					
		5	38	Documentation mode		High	See table <a href="#">Value Range for Documenta- tion mode on page 30</a>		
		6	39	—					
		7	40	—					
	5	0	41	—					
		1	42	—					
		2	43	—					
		3	44	—					
		4	45	—					
		5	46	—					
		6	47	—					
		7	48	Disable process controlled cor- rection		High			

Adresse				Signal	Beschreibung	Aktivität / Datentyp	Bereich	Faktor
relativ			absolut					
WORD	BYTE	BIT	BIT					
3	6	0	49	—				
		1	50	—				
		2	51	—				
		3	52	—				
		4	53	—				
		5	54	—				
		6	55	—				
		7	56	—				
	7	0	57	ExtInput1 => OPT_Output 1		High		
		1	58	ExtInput2 => OPT_Output 2		High		
		2	59	ExtInput3 => OPT_Output 3		High		
		3	60	ExtInput4 => OPT_Output 4		High		
		4	61	ExtInput5 => OPT_Output 5		High		
		5	62	ExtInput6 => OPT_Output 6		High		
		6	63	ExtInput7 => OPT_Output 7		High		
7		64	ExtInput8 => OPT_Output 8		High			
4	8 - 9	0-15	65- 80	Welding characteristic	Group 3	UINT16	0 to 65535	1
				Job number		UINT16	0 to 1000	1
5	10 - 11	0-15	81- 96	Welding process MIG/MAG: <sup>1)</sup> Constant Wire:  Wire feed speed command value	Group 3	SINT16	-327,68 to 327,67 [m/min]	100
				Welding process TIG: <sup>2)</sup>  Main- / Hotwire current command value		UINT16	0,0 to 6553,5 [A]	10

Adresse				Signal	Beschreibung	Aktivität / Datentyp	Bereich	Faktor
relativ			absolut					
WORD	BYTE	BIT	BIT					
6	12 - 13	0- 15	97- 112	Welding process MIG/MAG: <sup>1)</sup>  Arclength correction	Group 3	SINT16	-10,0 to +10,0 [steps]	10
				Welding process TIG: <sup>2)</sup>  Wire feed speed command value		SINT16	-327,68 to 327,67 [m/min]	100
				Welding process Constant Wire:  Current		SINT16	-10,0 to +10,0 [steps]	10
7	14- 15	0- 15	113 - 128	Welding process MIG/MAG: <sup>1)</sup> Constant Wire:  Pulse-/dynamic correction	Group3	SINT16	-10,0 to 10,0 [steps]	10
				Welding process TIG: <sup>2)</sup>  Wire correction		SINT16	-10,0 to +10,0 [steps]	10
8	16- 17	0- 15	129- 144	Welding process MIG/MAG: <sup>1)</sup> Constant Wire:  Wire retract correction	Group 2	UINT16	0,0 to 10,0	10
				Welding process TIG: <sup>2)</sup>  Wire retract end		UINT16	OFF, 1 to 50 [mm]	1
9	18- 19	0- 15	145 - 160	Welding speed	Group 3	UINT16	0 to 1000 [cm/min]	10
10	20- 21	0- 15	161- 176	Process controlled correction	Group 2	See table <a href="#">Value range for Process controlled correction</a> on page 30		
11	22- 23	0- 15	177- 192	Welding process TIG: <sup>2)</sup>  Wire positioning start		UINT16	OFF, 1 to 50 [mm]	1
12	24- 25	0- 15	193- 208	—				
13	26- 27	0- 15	209- 224	—				



Adresse				Signal	Beschreibung	Aktivität / Datentyp	Bereich	Faktor
relativ			absolut					
WORD	BYTE	BIT	BIT					
14	28-29	0-15	225-240	Welding process TIG: 2)  Plasma-gas command value		UINT16	0,1 to 9,0 [l/m]	10
15	30-31	0-15	241-256	Wire forward / backward length		UINT16	OFF / 1 to 65535 [mm]	1
16	32-33	0-15	257-272	Wire sense edge detection	Group 2	UINT16	OFF / 0,5 to 20,0 [mm]	10
17	34-35	0-15	273-288	—				
18	36-37	0-15	289-304	—				
19	38-39	0-15	305-320	Seam number		UINT16	0 to 65535	1
20	40	0	321	Disable Start-End-Parameter (Image)		High		
		1	322	Disable SFI-Parameter (Image)		High		
		2	323	Disable SP-Parameter (Image)		High		
		3	324	Disable Process-Mix-Parameter (Image)		High		
		4	325	Disable gas-settings (Image)		High		
		5	326	Disable components setup (TAG)		High		
		6	327	Disable language/units/standards (TAG)		High		
		7	328	Disable process controlled correction 2 (Image)		High		
	41	0	329	Enable arc break monitoring / arc loss		High		
		1	330	—				
		2	331	—				
		3	332	—				
		4	333	—				
		5	334	—				
		6	335	—				
		7	336	—				

Adresse				Signal	Beschreibung	Aktivität / Datentyp	Bereich	Faktor
relativ			absolut					
WORD	BYTE	BIT	BIT					
21	42	0	337	Enable resistance overwrite		High		
		1	338	Set resistance value		High		
		2	339	Enable inductance overwrite		High		
		3	340	Set inductance value		High		
		4	341	—				
		5	342	—				
		6	343	—				
		7	344	—				
	43	0	345	—				
		1	346	—				
		2	347	—				
		3	348	—				
		4	349	—				
		5	350	—				
		6	351	Command value selection Bit 0	00... Wire feed speed 01... Current	High	See table <a href="#">Value Range for Command value selection</a> on page 30	
		7	352	—				
22	44-45	0-15	353-368	TAG start address	Group 1	UINT16	0 to 65535	1
23	46-47	0-15	369-384	TAG value 1	Group 1	UINT16		
24	48-49	0-15	385-400	TAG value 2	Group 1	UINT16		
25	50-51	0-15	401-416	TAG value 3	Group 1	UINT16		
26	52-53	0-15	417-432	TAG value 4	Group 1	UINT16		
27	54-55	0-15	433-448	TAG value 5	Group 1	UINT16		
28	56	0-7	449-456	TAG quantity		UINT8	0 to 5	1
	57	0-7	457-464	TAG command	0x0001 = TAG Read   0x0002 =TAG Write	UINT8	0 to 2	1

Adresse				Signal	Beschreibung	Aktivität / Datentyp	Bereich	Faktor
relativ			absolut					
WORD	BYTE	BIT	BIT					
29	58-59	0-7	465-480	Gas preflow	Group 2	UINT16	0,0 to 9,9 [s]	10
30	60-61	0-15	481-496	Gas postflow	Group 2	UINT16	0 to 60 [s]	10
31	62-63	0-15	497-512	Inching value	Group 2	SINT16	-327,68 to 327,67 [m/min]	100
32	64-65	0-15	513-528	S2T starting current	Group 2	UINT16	0 to 400 [%]	1
33	66-67	0-15	529-544	S2T starting current time	Group 2	UINT16	Off (o) / 0,1 to 10,0 [s]	10
34	68-69	0-15	545-560	S2T slope 1	Group 2	UINT16	0,0 to 9,9 [s]	10
35	70-71	0-15	561-576	S2T slope 2	Group 2	UINT16	0,0 to 9,9 [s]	10
36	72-73	0-15	577-592	S2T end current	Group2	UINT16	0 to 400 [%]	1
37	74-75	0-15	593-608	S2T end current time	Group 2	UINT16	Off (o) / 0,1 to 10,0 [s]	10
38	76-77	0-15	609-624	Start arclength correction	Group 2	SINT16	-10 to +10	10
39	78-79	0-15	625-640	End arclength correction	Group 2	SINT16	-10 to +10	10
40	80-81	0-15	641-656	Welding process MIG/MAG: <sup>1)</sup> Constant Wire:  Process-Mix high power time correction	Group 3	SINT16	-10 to +10	10
41	82-83	0-15	657-672	Welding process MIG/MAG: <sup>1)</sup> Constant Wire:  Process-Mix low power time correction	Group 3	SINT16	-10 to +10	10

Adresse					Beschreibung	Aktivität / Datentyp	Bereich	Faktor
relativ			absolut					
WORD	BYTE	BIT	BIT	Signal				
42	84-85	0-15	673-688	Welding process MIG/MAG: <sup>1)</sup> Constant Wire:  Process-Mix low power correction	Group 3	SINT16	-10 to +10	10
43	86-87	0-15	689-704	SFI hotstart	Group 2	UINT16	Off (0,0) / 0,01 to 2,00 [s]	100
44	88-89	0-15	705-720	Welding process MIG/MAG: <sup>1)</sup> Constant Wire:  Process controlled correction 2	Group 2	See table <a href="#">Value range for Process controlled correction 2</a> on page 30		
45	90-91	0-15	721-736	Welding process MIG/MAG: <sup>1)</sup> Constant Wire:  SP delta wire feed	Group 2	SINT16	0,1 to 6,0	10
46	92-93	0-15	737-752	Welding process MIG/MAG: <sup>1)</sup> Constant Wire:  SP frequency	Group 2	SINT16	0,5 to 10,0 [Hz]	10
47	94-95	0-15	753-768	Welding process MIG/MAG: <sup>1)</sup> Constant Wire:  SP duty cycle	Group 2	SINT16	10 to 90	1
48	96-97	0-15	769-784	Welding process MIG/MAG: <sup>1)</sup> Constant Wire:  SP arclength correction high	Group 2	SINT16	-10 to +10	10
49	98-99	0-15	785-800	Welding process MIG/MAG: <sup>1)</sup> Constant Wire:  SP arclength correction low	Group 2	SINT16	-10 to +10	10
50	100-101	0-15	801-816	Resistance	Group 2	UINT16	0,0 to +400,0 [mOhm]	10

Adresse				Signal	Beschreibung	Aktivität / Datentyp	Bereich	Faktor
relativ			absolut					
WORD	BYTE	BIT	BIT					
51	102-103	0-15	817-832	Inductance	Group 2	UINT16	0,0 to +25,0 [Mikrohenry]	10

- 1) MIG/MAG Puls-Synergic, MIG/MAG Standard-Synergic, MIG/MAG Standard-Manuel, MIG/MAG PMC, MIG/MAG, LSC
- 2) TIG cold wire, TIG hot wire

#### 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
0	1	0	0	0	2-step mode characteristics
0	1	0	0	1	MIG/MAG Standard Manual, 2-step
1	1	0	0	0	R/L measurement
1	1	0	0	1	R/L alignment

Value range for operating mode

#### Value range Process 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

**Value Range for Documentation mode**

Bit 0	Description
0	Seam number of welding machine (internal)
1	Seam number of robot

*Value range for documentation mode*

**Value range for Process controlled correction**

Process	Signal	Activity / data type	Value range configuration range	Unit	Factor
PMC	Arc length stabilizer	SINT16	-3276.8 to +3276.7 0.0 to +5.0	Volts	10

*Value range for process-dependent correction*

**Value Range for Command value selection**

Bit 351	Description
0	Wirefeeder set value
1	Welding current set value

*Value range for set value*

**Value range for Process controlled correction 2**

Process	Signal	Activity / data type	Value range configuration range	Unit	Factor
PMC	Penetration stabilizer	SINT16	-3276.8 to +3276.7 0.0 to +10.0	m/min	10

*Value range for process-dependent correction 2*

## Availability of the output signals

The output signals listed below are available from firmware V4.3.0 of the TPS/i welding machine.

## Output signals (from welding machine to robot)

Adresse				Signal	Beschreibung	Aktivität / Datentyp	Bereich	Faktor
WORD	relativ	absolut						
WORD	BYTE	BIT	BIT	Signal	Beschreibung	Aktivität / Datentyp	Bereich	Faktor
0	0	0	1	Heartbeat power source		High	1 Hz	
		1	2	Power source ready		High		
		2	3	Warning		High		
		3	4	Process active		High		
		4	5	Current flow		High		
		5	6	Arc stable- / touch signal		High		
		6	7	Main current signal		High		
		7	8	Touch signal		High		
	1	0	9	Collision box active		Low	0 = collision or cable break	
		1	10	Robot motion release		High		
		2	11	Wire stick workpiece		High		
		3	12	Welding process TIG: <sup>2)</sup> Electrode overload		High		
		4	13	Welding process MIG/MAG: <sup>1)</sup> Constant Wire: Short circuit contact tip		High		
		5	14	Parameter selection internally		High		
		6	15	Characteristic number valid		High		
		7	16	Torch body gripped		High		

Adresse				Signal	Beschreibung	Aktivität / Datentyp	Bereich	Faktor
relativ			absolut					
WORD	BYTE	BIT	BIT					
1	2	0	17	Command value out of range		High		
		1	18	Correction out of range		High		
		2	19	—				
		3	20	Limitsignal		High		
		4	21	—				
		5	22	Standby active		High		
		6	23	Main supply status		Low		
		7	24	—				
	3	0	25	Sensor status 1		High	See table <a href="#">Assignment of Sensor Statuses 1–4</a> on page 38	
		1	26	Sensor status 2		High		
		2	27	Sensor status 3		High		
		3	28	Sensor status 4		High		
		4	29	—				
		5	30	—				
		6	31	—				
		7	32	—				



Adresse				Signal	Beschreibung	Aktivität / Datentyp	Bereich	Faktor
WORD	relativ	absolut						
	BYTE	BIT	BIT					
2	4	0	33	Function status Bit 0		High	See table <a href="#">Value Range for Function status</a> on page 39	
		1	34	Function status Bit 1		High		
		2	35	—				
		3	36	Safety status Bit 0		High	See table <a href="#">Value range Safety status</a> on page 39	
		4	37	Safety status Bit 1		High		
		5	38	—				
		6	39	Notification		High		
		7	40	System not ready		High		
	5	0	41	—				
		1	42	—				
		2	43	<i>Welding process TIG: 2)</i> Pulse current active		High		
		3	44	<i>Welding process TIG: 2)</i> Pilot arc active		High		
		4	45	Process run		High		
		5	46	—				
		6	47	Active prozesslinie Bit 0		High		
		7	48	Active prozesslinie Bit 1		High		

Adresse				Signal	Beschreibung	Aktivität / Datentyp	Bereich	Faktor
relativ		absolut						
WORD	BYTE	BIT	BIT					
3	6	0	49	Process Bit 0		High	See table Value Range for Process Bit on page 39	
		1	50	Process Bit 1		High		
		2	51	Process Bit 2		High		
		3	52	Process Bit 3		High		
		4	53	Process Bit 4		High		
		5	54	—				
		6	55	Welding process MIG/MAG: <sup>1)</sup> Constant Wire:  Touch signal gas nozzle		High		
		7	56	Welding process MIG/MAG: <sup>1)</sup> Constant Wire:  TWIN synchronization active		High		
	7	0	57	ExtOutput1 <= OPT_Input1		High		
		1	58	ExtOutput2 <= OPT_Input2		High		
		2	59	ExtOutput3 <= OPT_Input3		High		
		3	60	ExtOutput4 <= OPT_Input4		High		
		4	61	ExtOutput5 <= OPT_Input5		High		
		5	62	ExtOutput6 <= OPT_Input6		High		
		6	63	ExtOutput7 <= OPT_Input7		High		
		7	64	ExtOutput8 <= OPT_Input8		High		
4	8- 9	0-15	65-80	Real value welding voltage	Group 3 ana- log meter	UINT16	0,00 to 327,67 [V]	10 0
5	10-11	0-15	81-96	Real value welding current	Group 3 ana- log meter	UINT16	0,00 to 327,67 [A]	10
6	12-13	0-15	97-112	Real value wire feed speed	Group 3 ana- log meter	SINT16	-327,68 to 327,67 [m/min]	10 0
7	14-15	0-15	113-128	Welding process MIG/MAG: <sup>1)</sup> Constant Wire:  Actual real value for seam tracking		UINT16	0 to 65535	10 00 0

Adresse				Signal	Beschreibung	Aktivität / Datentyp	Bereich	Faktor
relativ			absolut					
WORD	BYTE	BIT	BIT					
8	16-17	0-15	129-144	Error number		UINT16	0 to 65535	1
9	18-19	0-15	145-160	Warning number		UINT16	0 to 65535	1
10	20-21	0-15	161-176	Motor current M1		SINT16	-327,68 to 327,67 [A]	10 0
11	22-23	0-15	177-192	Motor current M2		SINT16	-327,68 to 327,67 [A]	10 0
12	24-25	0-15	193-208	Motor current M3		SINT16	-327,68 to 327,67 [A]	10 0
13	26-27	0-15	209-224	Welding process TIG: <sup>2)</sup>  Actual real value AVC		UINT16	0,00 to 655,35 [V]	10 0
14	28-29	0-15	225-240	—				
15	30-31	0-15	241-256	—				
16	32-33	0-15	257-272	Wire position		SINT16	-327,68 to 327,67 [mm]	10 0
17	34-35	0-15	273-288	—				
18	36-37	0-15	289-304	—				
19	38	0-15	305-320	—				

Adresse				Signal	Beschreibung	Aktivität / Datentyp	Bereich	Faktor
relativ			absolut					
WORD	BYTE	BIT	BIT					
20	40	0	321	WebJobEditor enable		High		
		1	322	Wirefeeder required		High		
		2	323	—				
		3	324	—				
		4	325	—				
		5	326	—				
		6	327	—				
		7	328	—				
	41	0	329	—				
		1	330	—				
		2	331	—				
		3	332	—				
		4	333	—				
		5	334	—				
		6	335	—				
		7	336	—				
21	42	0	337	—				
		1	338	—				
		2	339	—				
		3	340	—				
		4	341	—				
		5	342	—				
		6	343	—				
		7	344	—				
	43	0	345	—				
		1	346	—				
		2	347	—				
		3	348	—				
		4	349	—				
		5	350	—				
		6	351	—				
		7	352	—				
22	44-45	0-15	353-368	TAG Start address		UINT16	0 to 65535	1
23	46-47	0-15	369-384	TAG value 1		UINT16		

Adresse				Signal	Beschreibung	Aktivität / Datentyp	Bereich	Faktor
relativ			absolut					
WORD	BYTE	BIT	BIT					
24	48-49	0-15	385-400	TAG value 2		UINT16		1
25	50-51	0-15	401-416	TAG value 3		UINT16		1
26	52-53	0-15	417-432	TAG value 4		UINT16		1
27	54-55	0-15	433-448	TAG value 5		UINT16		1
28	56	0-7	449-456	TAG quantity		UINT8	0 to 5	1
	57	0-7	457-464	TAG command	0x0001 = TAG Read   0x0002 =TAG Write	UINT8	0 to 2	1
29	58-59	0-15	465-480	Cooler temperature		SINT16	-100 to +200 [°C]	10
30	60-61	0-15	481-496	Cooler flow rate		SINT16	-100 to +100 [l/min]	10 0
31	62-63	0-15	497-512	Real energy actual value		UINT16	0,0 to 6553,5 [kJ]	10
32	64-65	0-15	513-528	Power actual value		UINT16	0,0 to 6553,5 [kW]	10
33 - 34	66-71	0-32	529-544	Hour meter power on		UINT32	0 to 100000 [h]	10
35 - 36	70-73	0-32	561-576	Hour meter arc time		UINT32	0 to 100000 [h]	10
37	74-75	0-15	593-608	Gaspreflow		UINT16	0,0 to 9,9 [s]	10
38	76-77	0-15	609-624	Gaspostflow		UINT16	0,0 to 9,9 [s]	10
39	78-79	0-15	625-640	S2T starting current time		UINT16	Off (o) / 0,1 to 10,0 [s]	10
40	80-81	0-15	641-656	S2T slope 1		UINT16	0,0 to 9,9 [s]	10

Adresse				Signal	Beschreibung	Aktivität / Datentyp	Bereich	Faktor
relativ			absolut					
WORD	BYTE	BIT	BIT					
41	82-83	0-15	657-672	S2T slope 2		UINT16	0,0 to 9,9 [s]	10
42	84-85	0-15	673-688	S2T end current time		UINT16	Off (o) / 0,1 to 10,0 [s]	10
43	86-87	0-15	689-704	Gas real value		UINT16	0,0 to 100,0 [steps]	10
44	88-89	0-15	705-720	—				
45	90-91	0-15	721-736	—				
46	92-93	0-15	737-752	—				
47	94-95	0-15	753-768	—				
48	96-97	0-15	769-784	—				
49	98-99	0-15	785-800	—				
50	100-101	0-15	801-816	Resistance	Group 2	UINT16	0 to +400 [mOhm]	10
51	102-103	0-15	817-832	Inductance	Group 2	UINT16	0 to +250 [Mik-rohenry]	10

- 1) MIG/MAG Puls-Synergic, MIG/MAG Standard-Synergic, MIG/MAG Standard-Manuel, MIG/MAG PMC, MIG/MAG, LSC
- 2) TIG cold wire, TIG hot wire

#### 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)

Assignment of sensor statuses

**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  
Function status**

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

*Value range for function 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	ConstantWire
0	1	0	1	0	ColdWire
0	1	0	1	1	DynamicWire

*Value Range for Process Bit*

**TAG Table for  
Input Signals**

Address	TAG	Value
<b>BIT 325</b>	<b>Disable Gas settings:</b>	
TAG 30	MIG Gasvalue	
TAG 31	MIG Gasfactor	
TAG 32	—	

Address	TAG	Value
<b>BIT 325</b>	<b>Disable Gas settings:</b>	
TAG 33	—	
TAG 34	—	
TAG 35	—	
TAG 36	—	
TAG 37	—	
TAG 38	—	
TAG 39	—	

Address	TAG	Value
<b>BIT 326</b>	<b>Disable components setup:</b>	
TAG 40	Cooling unit mode	See table <a href="#">Value Range for Cooling unit mode</a> on page 41
TAG 41	Delay time flow sensor	
TAG 42	Touch sensing sensitivity	
TAG 43	Ignition time out	
TAG 44	—	
TAG 45	—	
TAG 46	—	
TAG 47	—	
TAG 48	—	
TAG 49	—	

Address	TAG	Value
<b>BIT 327</b>	<b>Disable language/units/standards:</b>	
TAG 50	Language	See <a href="#">Value Table</a> on page 41
TAG 51	Unit (metric/imperial)	
TAG 52	Welding standard (AWS/EU)	
TAG 53	—	
TAG 54	—	
TAG 55	—	
TAG 56	—	
TAG 57	—	
TAG 58	—	
TAG 59	—	
TAG 60	Arc break filter time / arc loss error time	
TAG 61	Arc break monitoring reaction	



**Value Range for Cooling unit mode**

TAG 40	Description
1	eco
2	auto
3	on
4	off

*Value Range for Cooling unit mode*

**Value Table**

Address	Description	Value
<b>Language:</b>		
0	—	
1	English	
2	German	
3	Japanese	
4	Chinese	
5	Spanish	
6	French	
7	Czech	
8	Hungarian	
9	Italian	
10	Norwegian	
11	Polish	
12	Portuguese	
13	Slovakian	
14	Turkish	
15	Russian	
16	Swedish	
17	Estonian	
18	Finnish	
19	Lithuanian	
20	Latvian	
21	Dutch	
22	Slovenian	
23	Romanian	
24	Croatian	
25	Ukrainian	
26	Korean	
27	Icelandic	
28	Vietnamese	

Address	Description	Value
<b>Language:</b>		
29	Thai	
30	Indonesian	
31	Serbian	
32	Hindi	
33	Tamil	
34	Danish	
35	Bulgarian	

Address	Description	Value
<b>Unit (imperial/metric):</b>		
0	—	
1	Imperial	
2	Metric	

Address	Description	Value
<b>Welding standard (AWS/EU):</b>		
0	—	
1	AWS	
2	CEN	

#### TAG Table for Output Signals

Address	Description	Value
<b>Welding-relevant values:</b>		
TAG 10001	Welding voltage	
TAG 10002	Welding current	
TAG 10003	Wire feed speed	
TAG 10004	Real value power	
TAG 10005	Ignitiondistance	
TAG 10006	—	
TAG 10007	—	
TAG 10008	—	
TAG 10009	—	
TAG 10010	—	
TAG 10011	—	
TAG 10012	—	
TAG 10013	—	
TAG 10014	—	
TAG 10015	—	

Address	Description	Value
<b>Welding system-relevant values:</b>		
TAG 10100	Vd max. processline	
TAG 10101	Max. current weldingsystem	
TAG 10102	—	
TAG 10103	Safety status	
TAG 10104	—	
TAG 10105	—	
TAG 10106	—	
TAG 10107	—	
TAG 10108	—	
TAG 10109	—	
TAG 10110	—	
TAG 10111	—	

Address	Description	Value
<b>Documentation-relevant values:</b>		
TAG 10200	Welding time	
TAG 10201	Section time	
TAG 10202	—	



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