

# Operating Instructions

**RI FB PRO/i TWIN Controller**  
**RI MOD/i CC Ethernet/IP-2P**

**DE** | Bedienungsanleitung

**EN-US** | Operating instructions





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# Allgemeines

## Sicherheit

### **WARNUNG!**

#### **Gefahr durch Fehlbedienung und fehlerhaft durchgeführte Arbeiten.**

Schwere Personen- und Sachschäden können die Folge sein.

- ▶ Alle in diesem Dokument beschriebenen Arbeiten und Funktionen dürfen nur von technisch geschultem Fachpersonal ausgeführt werden.
- ▶ Dieses Dokument vollständig lesen und verstehen.
- ▶ Sämtliche Sicherheitsvorschriften und Benutzerdokumentationen dieses Gerätes und aller Systemkomponenten lesen und verstehen.

### **WARNUNG!**

#### **Gefahr durch elektrischen Strom.**

Schwere Personen- und Sachschäden können die Folge sein.

- ▶ Vor Beginn der Arbeiten alle beteiligten Geräte und Komponenten ausschalten und vom Stromnetz trennen.
- ▶ Alle beteiligten Geräte und Komponenten gegen Wiedereinschalten sichern.

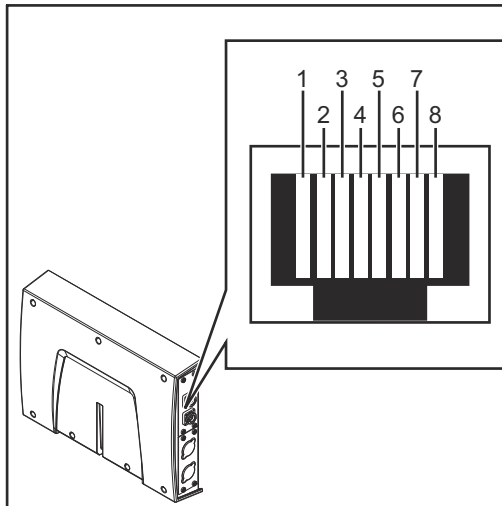
### **WARNUNG!**

#### **Gefahr durch unplanmäßige Signalübertragung.**

Schwere Personen- und Sachschäden können die Folge sein.

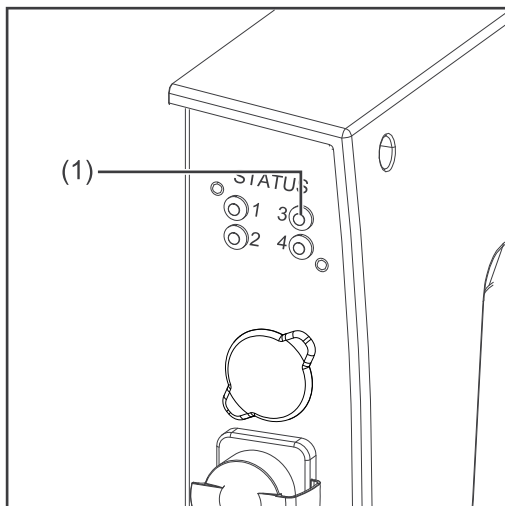
- ▶ Über das Interface keine sicherheitsrelevanten Signale übertragen.

## Anschlüsse und Anzeigen



Pin-Belegung RJ 45 ProfiNet Anschluss

1	TX+
2	TX-
3	RX+
6	RX-
4,5,7, 8	Normalerweise nicht verwendet; um die Signalfullständigkeit sicherzustellen, sind diese Pins miteinander verbunden und enden über einen Filterkreis am Schutzleiter (PE).



### (1) LED MS - Modulstatus

**Aus:**

keine Versorgungsspannung

**Leuchtet grün:**

gesteuert durch einen Master

**Blinkt grün (einmal):**

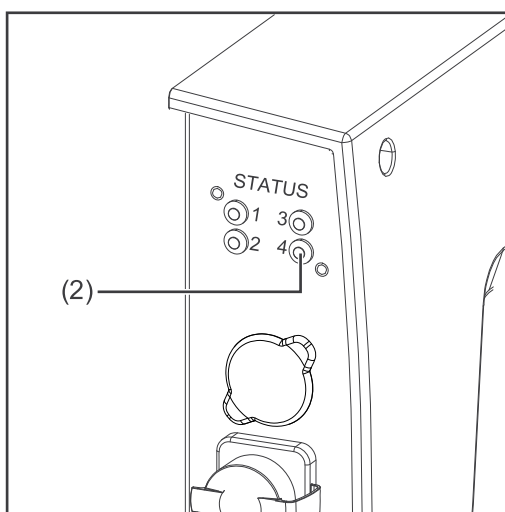
Master nicht konfiguriert oder im Ruhezustand

**Leuchtet rot:**

Hauptfehler (Ausnahmestand, schwerer Fehler, ...)

**Blinkt rot:**

behebbarer Fehler



### (2) LED NS - Netzwerkstatus

**Aus:**

keine Versorgungsspannung oder keine IP-Adresse

**Leuchtet grün:**

Online; eine oder mehrere Verbindungen hergestellt (CIP Kategorie 1 oder 3)

**Blinkt grün:**

Online; keine Verbindung hergestellt

**Leuchtet rot:**

doppelte IP-Adresse, schwerer Fehler

**Blinkt rot:**

Zeitüberlauf bei einer oder mehreren Verbindungen (CIP Kategorie 1 oder 3)

## Eigenschaften der Datenübertragung

### Übertragungstechnik

Ethernet

### Medium

Bei der Auswahl der Kabel und Stecker ist die ODVA Empfehlung für die Planung und Installation von EtherNet/IP Systemen zu beachten.

Seitens Hersteller wurden die EMV-Tests mit dem Kabel IE-C5ES8VG0030-M40M40-F durchgeführt.

### Übertragungs-Geschwindigkeit

10 Mbit/s or 100 Mbit/s

### Busanschluss

RJ-45 Ethernet / M12

## Konfigurationsparameter

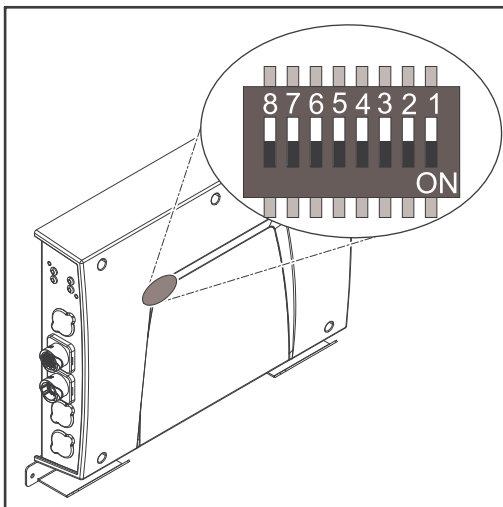
Bei einigen Robotersteuerungen kann es erforderlich sein die hier beschriebenen Konfigurationsparameter anzugeben, damit das Busmodul mit dem Roboter kommunizieren kann.

Parameter	Wert	Beschreibung
Vendor ID	0534 <sub>hex</sub> (1332 <sub>dez</sub> )	Fronius International GmbH
Device Type	000C <sub>hex</sub> (12 <sub>dez</sub> )	Communication adapter
Product Code	0380 <sub>hex</sub> (896 <sub>dez</sub> )	Fronius FB Pro TwinEthernet/IP-2-Port
Product Name	Fronius-FB-Pro-Twin-EtherNetIP(TM)	

Image Type	Instance Type	Instance Name	Instance Description	Instance Number	Size [Byte]
Standard Image	Producing Instance	Input Data Standard	Data from power source to robot	104	60
	Consuming Instance	Output Data Standard	Data from robot to power source	154	60

# IP-Adresse des Busmoduls einstellen

## IP-Adresse des Busmoduls einstellen



Die IP-Adresse des Busmoduls kann eingestellt werden:

1. mit dem DIP-Schalter im Interface im Bereich 192.168.0.xx (xx = DIP-Schalterstellung = 1 bis 63)
  - Werksseitig sind alle Positionen in Stellung OFF geschaltet. In diesem Fall muss die Einstellung der IP-Adresse auf der Website der Stromquelle eingestellt werden
2. auf der Website der Stromquelle (wenn alle Positionen des DIP-Schalters in Stellung OFF geschaltet sind)

Die IP-Adresse wird mit den Positionen 1 bis 6 des DIP-Schalters eingestellt. Die Einstellung erfolgt im Binärformat. Das ergibt einen Einstellbereich von 1 bis 63 im Dezimalformat.

### Beispiel für das Einstellen der IP-Adresse des Busmoduls mit dem DIP-Schalter im Interface:

DIP-Schalter								IP-Adresse
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

### Anleitung für das Einstellen der IP-Adresse auf der Website der Stromquelle (SmartManager):

IP-Adresse der verwendeten Stromquelle notieren:

- 1 Am Bedienpanel der Stromquelle „Voreinstellungen“ auswählen
- 2 Am Bedienpanel der Stromquelle „System“ auswählen
- 3 Am Bedienpanel der Stromquelle „Information“ auswählen
- 4 Angezeigte IP-Adresse notieren (Beispiel: 10.5.72.13)

Website der Stromquelle im Internetbrowser aufrufen:

- 5 Computer mit dem Netzwerk der Stromquelle verbinden
- 6 IP-Adresse der Stromquelle in die Suchleiste des Internetbrowsers eingeben und bestätigen
- 7 Standard-Benutzernamen (admin) und Passwort (admin) eingeben
  - Website der Stromquelle wird angezeigt

IP-Adresse des Busmoduls einstellen:

- 8 Auf der Website der Stromquelle den Reiter „RI FB PRO/i TWIN“ auswählen

- 9** Bei Punkt „Feldbus Konfiguration“ die gewünschte IP-Adresse für das Interface eingeben  
Beispielsweise: 192.168.0.12
- 10** „Konfiguration setzen“ auswählen
- 11** „Feldbus-Modul neu starten“ auswählen
  - die eingestellte IP-Adresse wird übernommen



# Ein- und Ausgangssignale

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## Datentypen

Folgende Datentypen werden verwendet:

- **UINT16** (Unsigned Integer)  
Ganzzahl im Bereich von 0 bis 65535
- **SINT16** (Signed Integer)  
Ganzzahl im Bereich von -32768 bis 32767

### Umrechnungsbeispiele:

- für positiven Wert (SINT16)  
z.B. gewünschter Drahtvorschub x Faktor  
 $12.3 \text{ m/min} \times 100 = 1230_{\text{dez}} = 04\text{CE}_{\text{hex}}$
- für negativen Wert (SINT16)  
z.B. gewünschte Lichtbogen-Korrektur x Faktor  
 $-6.4 \times 10 = -64_{\text{dez}} = \text{FFCO}_{\text{hex}}$

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## Verfügbarkeit der Eingangssignale

Die nachfolgend angeführten Eingangssignale sind ab Firmware V1.8.0 des RI FB PRO/i TWIN Controller verfügbar.

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## Eingangssignale (vom Roboter zur Stromquelle)

Adresse							
relativ			absolut				
WORD	BYTE	BIT	BIT	Signal	Aktivität / Datentyp	Bereich	Faktor
0	0	0	0	Welding Start	steigend		
		1	1	Robot ready	High		
		2	2	Working mode Bit 0	High	Siehe nachfolgende Tabelle <b>Wertebereich Working mode</b> auf Seite <b>16</b>	
		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	—				
	1	0	8	Gas on	steigend		
		1	9	Wire forward	steigend		
		2	10	Wire backward	steigend		
		3	11	Error quit	steigend		
		4	12	Touch sensing	High		
		5	13	Torch blow out	steigend		
		6	14	Processline selection Bit 0 (only available for single-wire applications)	High	Siehe nachfolgende Tabelle <b>Wertebereich Processline selection</b> auf Seite <b>16</b>	
7	15	Processline selection Bit 1 (only available for single-wire applications)	High				
1	2	0	16	Welding Simulation	High		
		1	17	—			
		2	18	—			
		3	19	—			
		4	20	—			
		5	21	—			
		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 sense start	steigend		
6		30	Wire sense break	steigend			
7	31	—					

Adresse							
relativ			absolut				
WORD	BYTE	BIT	BIT	Signal	Aktivität / Datentyp	Bereich	Faktor
2	4	0	32	Operating mode TWIN System Bit 0	High	Siehe nachfolgende Tabelle <b>Wertebereich Operating mode TWIN System</b> auf Seite 17	
		1	33	Operating mode TWIN System Bit 1	High		
		2	34	—			
		3	35	—			
		4	36	—			
		5	37	Documentation mode	High	Siehe nachfolgende Tabelle <b>Wertebereich Documentation mode</b> auf Seite 17	
		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, Power source 1	High			

Adresse								
relativ		absolut						
WORD	BYTE	BIT	BIT	Signal	Aktivität / Datentyp	Bereich	Faktor	
3	6	0	48	—				
		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		
		5	61	ExtInput6 => OPT_Output 6		High		
6		62	ExtInput7 => OPT_Output 7		High			
7	63	ExtInput8 => OPT_Output 8		High				
4	8	0	64	—				
		1	65	—				
		2	66	—				
		3	67	—				
		4	68	—				
		5	69	—				
		6	70	—				
	7	71	Disable Process controlled correction, Power source 2		High			
	9	0	72	Contact tip short circuit detection on		High		
		1	73	—				
		2	74	—				
		3	75	—				
		4	76	—				
		5	77	—				
6		78	—					
7	79	—						
5	10	0-7	80-87	—				
	11	0-7	88-95	—				

Adresse							
relativ		absolut					
WORD	BYTE	BIT	BIT	Signal	Aktivität / Datentyp	Bereich	Faktor
6	12	0-7	96-103	Welding characteristic- / Job number, Power source 1	UINT16	0 bis 1000	1
	13	0-7	104-111				
7	14	0-7	112-119	Welding characteristic- / Job number, Power source 2	UINT16	0 bis 1000	1
	15	0-7	120-127				
8	16, 17	0-7	128-143	<i>Beim Schweißverfahren MIG/MAG Puls-Synergic, MIG/MAG Standard-Synergic, MIG/MAG Standard-Manuell, MIG/MAG PMC, MIG/MAG LSC, CMT, ConstantWire:</i> <b>Wire feed speed command value, Power source 1</b>	SINT16	-327,68 bis 327,67 [m/min]	100
				<i>Beim Job-Betrieb:</i> <b>Power correction, Power source 1</b>	SINT16	-20,00 bis 20,00 [%]	100
9	18, 19	0-7	144-159	<i>Beim Schweißverfahren MIG/MAG Puls-Synergic, MIG/MAG Standard-Synergic, MIG/MAG Standard-Manuell, MIG/MAG PMC, MIG/MAG LSC, CMT, ConstantWire:</i> <b>Wire feed speed command value, Power source 2</b>	SINT16	-327,68 bis 327,67 [m/min]	100
				<i>Beim Job-Betrieb:</i> <b>Power correction, Power source 2</b>	SINT16	-20,00 bis 20,00 [%]	100

Adresse							
relativ		absolut					
WORD	BYTE	BIT	BIT	Signal	Aktivität / Datentyp	Bereich	Faktor
10	20, 21	0-7	160-175	<i>Beim Schweißverfahren MIG/MAG Puls-Synergic, MIG/MAG Standard-Synergic, MIG/MAG PMC, MIG/MAG LSC, CMT:</i>  <b>Arclength correction, Power source 1</b>	SINT16	-10,0 bis 10,0 [Schritte]	10
				<i>Beim Schweißverfahren MIG/MAG Standard-Manuell:</i>  <b>Welding voltage, Power source 1</b>	UINT16	0,0 bis 6553,5 [V]	10
				<i>Beim Job-Betrieb:</i>  <b>Arclength correction, Power source 1</b>	SINT16	-10,0 bis 10,0 [Schritte]	10
				<i>Beim Schweißverfahren ConstantWire:</i>  <b>Hotwire current, Power source 1</b>	UINT16	0,0 bis 6553,5 [A]	10
11	22, 23	0-7	176-191	<i>Beim Schweißverfahren MIG/MAG Puls-Synergic, MIG/MAG Standard-Synergic, MIG/MAG PMC, MIG/MAG LSC, CMT:</i>  <b>Arclength correction, Power source 2</b>	SINT16	-10,0 bis 10,0 [Schritte]	10
				<i>Beim Schweißverfahren MIG/MAG Standard-Manuell:</i>  <b>Welding voltage, Power source 2</b>	UINT16	0,0 bis 6553,5 [V]	10
				<i>Beim Job-Betrieb:</i>  <b>Arclength correction, Power source 2</b>	SINT16	-10,0 bis 10,0 [Schritte]	10
				<i>Beim Schweißverfahren ConstantWire:</i>  <b>Hotwire current, Power source 2</b>	UINT16	0,0 bis 6553,5 [A]	10

Adresse									
relativ			absolut						
WORD	BYTE	BIT	BIT	Signal	Aktivität / Datentyp	Bereich	Faktor		
12	24, 25	0-7	192-207	<i>Beim Schweißverfahren MIG/MAG Puls-Synergic, MIG/MAG Standard-Synergic, MIG/MAG PMC, MIG/MAG LSC, CMT:</i> <b>Pulse-/dynamic correction, Power source 1</b>	SINT16	-10,0 bis 10,0 [Schritte]	10		
				<i>Beim Schweißverfahren MIG/MAG Standard-Manuell:</i> <b>Dynamic, Power source 1</b>	UINT16	0,0 bis 10,0 [Schritte]	10		
13	26, 27	0-7	208-223	<i>Beim Schweißverfahren MIG/MAG Puls-Synergic, MIG/MAG Standard-Synergic, MIG/MAG PMC, MIG/MAG LSC, CMT:</i> <b>Pulse-/dynamic correction, Power source 2</b>	SINT16	-10,0 bis 10,0 [Schritte]	10		
				<i>Beim Schweißverfahren MIG/MAG Standard-Manuell:</i> <b>Dynamic, Power source 2</b>	UINT16	0,0 bis 10,0 [Schritte]	10		
14	28	0-7	224-231	Wire retract correction, Power source 1	UINT16	0,0 bis 10,0	10		
	29	0-7	232-239						
15	30	0-7	240-247	Wire retract correction, Power source 2	UINT16	0,0 bis 10,0	10		
	31	0-7	248-255						
16	32	0-7	256-263	Welding speed	UINT16	0,0 bis 1000 [m/min]	10		
	33	0-7	264-271						
17	34	0-7	272-279	Process controlled correction, Power source 1	SINT16	Siehe Tabelle <b>Wertebereich Process controlled correction</b> auf Seite <b>17</b>			
	35	0-7	280-287						
18	36	0-7	288-295	Process controlled correction, Power source 2	SINT16				
	37	0-7	296-303						
19	38	0-7	304-311	Wire forward / backward length	UINT16			OFF / 1 bis 65535 [mm]	1
	39	0-7	312-319						
20	40	0-7	320-327	Wire sense edge detection	UINT16	OFF / 0,5 bis 20,0 [mm]	10		
	41	0-7	328-335						
21	42	0-7	336-343	—					
	43	0-7	344-351						

Adresse				Signal	Aktivität / Datentyp	Bereich	Faktor
relativ		absolut					
WORD	BYTE	BIT	BIT				
22	44	0-7	352-359	—			
	45	0-7	360-367				
23	46	0-7	368-375	—			
	47	0-7	376-383				
24	48	0-7	384-391	—			
	49	0-7	392-399				
25	50	0-7	400-407	—			
	51	0-7	408-415				
26	52	0-7	416-423	—			
	53	0-7	424-431				
27	54	0-7	432-439	—			
	55	0-7	440-447				
28	56	0-7	448-455	—			
	57	0-7	456-463				
29	58	0-7	464-471	Seam number	UINT16	0 bis 65535	1
	59	0-7	472-479				

**Wertebereich  
Working mode**

Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Beschreibung
0	0	0	0	0	Parameteranwahl intern
0	0	0	0	1	Kennlinien Betrieb Sonder 2-Takt
0	0	0	1	0	Job-Betrieb
0	1	0	0	0	Kennlinien Betrieb 2-Takt
0	1	0	0	1	MIG/MAG Standard-Manuell 2-Takt
1	0	0	0	1	Kühlmittel-Pumpe stoppen

Wertebereich Betriebsart

**Wertebereich  
Processline  
selection**

Bit 1	Bit 0	Beschreibung
0	0	Prozesslinie 1 (default)
0	1	Prozesslinie 2
1	0	Prozesslinie 3
1	1	Reserviert

Wertebereich Prozesslinien-Auswahl



**Wertebereich  
Operating mode  
TWIN System**

Bit 1	Bit 0	Funktion Stromquelle 1	Funktion Stromquelle 2
0	0	Single mode	OFF
0	1	TWIN Lead	TWIN Trail
1	0	TWIN Trail	TWIN Lead
1	1	OFF	Single mode

Wertebereich Betriebsart TWIN System

**Wertebereich  
Documentation  
mode**

Bit 0	Beschreibung
0	Nahtnummer von Stromquelle (intern)
1	Nahtnummer von Roboter (Word 29)

Wertebereich Dokumentationsmodus

**Wertebereich  
Process control-  
led correction**

Prozess	Signal	Aktivität / Datentyp	Wertebereich Einstellbereich	Einheit	Faktor
PMC	Arc length stabilizer	SINT16	-327,8 bis +327,7 0,0 bis +5,0	Volt	10

Wertebereich prozessabhängige Korrektur

**Verfügbarkeit  
der Ausgangssi-  
gnale**

Die nachfolgend angeführten Ausgangssignale sind ab Firmware V1.8.0 des RI  
FB PRO/i TWIN Controller verfügbar.

**Ausgangssignale  
(von der Strom-  
quelle zum Ro-  
boter)**

Adresse				Signal	Aktivität / Datentyp	Bereich	Faktor
relativ		absolut					
WORD	BYTE	BIT	BIT				
0	0	0	0	Heartbeat Powersource	High / Low	1 Hz	
		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	Collisionbox active	Low	0 = Kollision oder Kabelbruch	
		1	9	Robot Motion Release, Power source 1	High		
		2	10	Wire stick workpiece	High		
		3	11	—			
		4	12	Short circuit contact tip	High		
		5	13	Parameter selection internally	High		
		6	14	—			
7	15	Torch body gripped	High				

Adresse								
relativ		absolut						
WORD	BYTE	BIT	BIT	Signal	Aktivität / Datentyp	Bereich	Faktor	
1	2	0	16	Command value out of range	High			
		1	17	Correction out of range	High			
		2	18	—				
		3	19	Limitsignal, Power Source 1	High			
		4	20	—				
		5	21	—				
		6	22	Main supply status	Low			
	7	23	—					
	3	0	24	Sensor status 1, Power Source 1	High	Siehe Tabelle <b>Zuordnung Sensorstatus 1-4</b> auf Seite <b>23</b>		
		1	25	Sensor status 2, Power Source 1	High			
		2	26	Sensor status 3, Power Source 1	High			
		3	27	Sensor status 4, Power Source 1	High			
		4	28	—				
		5	29	—				
6		30	—					
2	4	0	32	—				
		1	33	—				
		2	34	—				
		3	35	Safety status Bit 0, Power Source 1	High			
		4	36	Safety status Bit 1, Power Source 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	—						

Adresse							
relativ		absolut					
WORD	BYTE	BIT	BIT	Signal	Aktivität / Datentyp	Bereich	Faktor
3	6	0	48	—			
		1	49	—			
		2	50	—			
		3	51	—			
		4	52	—			
		5	53	—			
		6	54	Gas nozzle touched	High		
	7	55	—				
	7	0	56	ExtOutput1 <= OPT_Input1	High		
		1	57	ExtOutput2 <= OPT_Input2	High		
		2	58	ExtOutput3 <= OPT_Input3	High		
		3	59	ExtOutput4 <= OPT_Input4	High		
		4	60	ExtOutput5 <= OPT_Input5	High		
		5	61	ExtOutput6 <= OPT_Input6	High		
6		62	ExtOutput7 <= OPT_Input7	High			
7	63	ExtOutput8 <= OPT_Input8	High				
4	8	0	64	—			
		1	65	Robot Motion Release, Power source 2	High		
		2	66	Limitsignal, Power source 2	High		
		3	67	—			
		4	68	—			
		5	69	—			
		6	70	—			
	7	71	—				
	9	0	72	—			
		1	73	—			
		2	74	—			
		3	75	—			
		4	76	—			
		5	77	—			
6		78	—				
7	79	—					

Adresse							
relativ			absolut				
WORD	BYTE	BIT	BIT	Signal	Aktivität / Datentyp	Bereich	Faktor
5	10	0	80	Sensor status 1, Power Source 2	High	Siehe Tabelle <b>Zuordnung Sensorstatus 1-4</b> auf Seite <b>23</b>	
		1	81	Sensor status 2, Power Source 2	High		
		2	82	Sensor status 3, Power Source 2	High		
		3	83	Sensor status 4, Power Source 2	High		
		4	84	—			
		5	85	—			
		6	86	—			
		7	87	—			
	11	0	88	—			
		1	89	—			
		2	90	—			
		3	91	Safety status Bit 0, Power Source 2	High		
		4	92	Safety status Bit 1, Power Source 2	High		
		5	93	—			
		6	94	—			
7		95	—				
6	12	0-7	96-103	Welding voltage, Power source 1	UINT16	0,0 bis 655,35 [V]	100
	13	0-7	104-111				
7	14	0-7	112-119	Welding voltage, Power source 2	UINT16	0,0 bis 655,35 [V]	100
	15	0-7	120-127				
8	16	0-7	128-135	Welding current, Power source 1	UINT16	0,0 bis 6553,5 [A]	10
	17	0-7	136-143				
9	18	0-7	144-151	Welding current, Power source 2	UINT16	0,0 bis 6553,5 [A]	10
	19	0-7	152-159				
10	20	0-7	160-167	Wire feed speed, Power source 1	SINT16	-327,68 bis 327,67 [m/min]	100
	21	0-7	168-175				
11	22	0-7	176-183	Wire feed speed, Power source 2	SINT16	-327,68 bis 327,67 [m/min]	100
	23	0-7	184-191				
12	24	0-7	192-199	Actual real value for seam tracking	UINT16	0 bis 6,5535	1000 0
	25	0-7	200-207				
13	26	0-7	208-215	Error number, Power source 1	UINT16	0 bis 65535	1
	27	0-7	216-223				

Adresse				Signal	Aktivität / Datentyp	Bereich	Faktor
relativ		absolut					
WORD	BYTE	BIT	BIT				
14	28	0-7	224-231	Error number, Power source 2	UINT16	0 bis 65535	1
	29	0-7	232-239				
15	30	0-7	240-247	Motor current M1, Power source 1	UINT16	-327,68 bis 327,67 [A]	100
	31	0-7	248-255				
16	32	0-7	256-263	Motor current M1, Power source 2	UINT16	-327,68 bis 327,67 [A]	100
	33	0-7	264-271				
17	34	0-7	272-279	Motor current M2, Power source 1	UINT16	-327,68 bis 327,67 [A]	100
	35	0-7	280-287				
18	36	0-7	288-295	Motor current M2, Power source 2	UINT16	-327,68 bis 327,67 [A]	100
	37	0-7	296-303				
19	38	0-7	304-311	Motor current M3, Power source 1	UINT16	-327,68 bis 327,67 [A]	100
	39	0-7	312-319				
20	40	0-7	320-327	Motor current M3, Power source 2	UINT16	-327,68 bis 327,67 [A]	100
	41	0-7	328-335				
21	42	0-7	336-343	Warning, Power source 1	UINT16	0 bis 65535	1
	43	0-7	344-351				
22	44	0-7	352-359	Warning, Power source 2	UINT16	0 bis 65535	1
	45	0-7	360-367				
23	46	0-7	368-375	Wire position, Power source 1	UINT16	-327,68 bis 327,67 [mm]	100
	47	0-7	376-383				
24	48	0-7	284-291	Wire position, Power source 2	UINT16	-327,68 bis 327,67 [mm]	100
	49	0-7	292-399				
25	50	0-7	400-407	—			
	51	0-7	408-415				
26	52	0-7	416-423	—			
	53	0-7	424-431				
27	54	0-7	432-439	—			
	55	0-7	440-447				
28	56	0-7	448-455	—			
	57	0-7	456-463				
29	58	0-7	464-471	—			
	59	0-7	472-479				

**Zuordnung Sensorstatus 1-4**

<b>Signal</b>	<b>Beschreibung</b>
Sensor status 1	OPT/i WF R Drahtende (4,100,869)
Sensor status 2	OPT/i WF R Drahtfass (4,100,879)
Sensor status 3	OPT/i WF R Ringsensor (4,100,878)
Sensor status 4	Drahtpufferset CMT TPS/i (4,001,763)





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# 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 equipment and all system components.

### **WARNING!**

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

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

- ▶ 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.

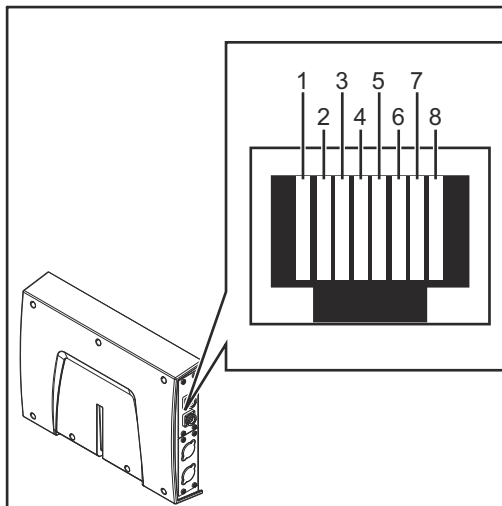
### **WARNING!**

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

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

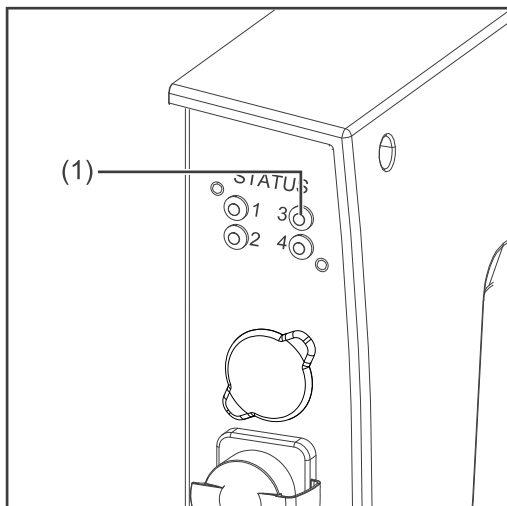
- ▶ Do not transfer safety signals via the interface.

## Connections and Displays



*RJ45 connection*

1	TX+
2	TX-
3	RX+
6	RX-
4,5,7,8	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).



#### (1) LED MS - Module status

**Off:**

No supply voltage

**Lights up green:**

Controlled by a master

**Flashes green (once):**

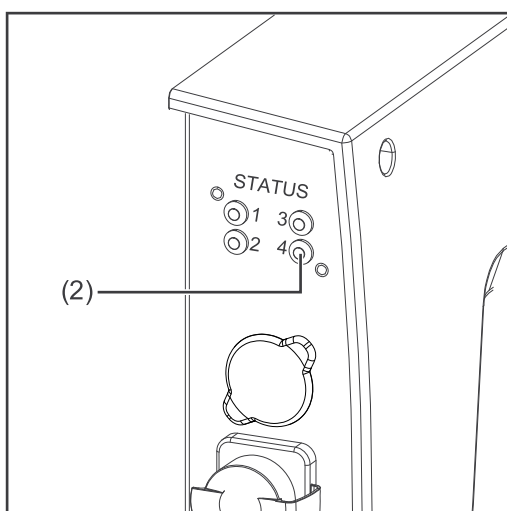
Master not configured or master idle

**Lights up red:**

Major error (exception state, serious fault, ...)

**Flashes red:**

Correctable error



#### (2) LED NS - Network status

**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 connection established

**Lights up red:**

Double IP address, serious error

**Flashes red:**

Overrun of time for one or more connections (CIP category 1 or 3)

### Data Transfer Properties

#### Transfer technology

Ethernet

#### Medium

When selecting the cables and plugs, 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 / M12

### Configuration Parameters

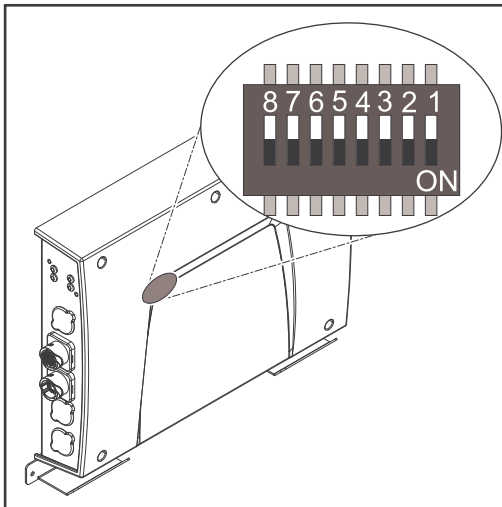
In some robot control systems, it may be necessary to state the configuration parameters described here so that the bus module can communicate with the robot.

Parameter	Value	Description
Vendor ID	0534 <sub>hex</sub> (1332 <sub>dec</sub> )	Fronius International GmbH
Device Type	000C <sub>hex</sub> (12 <sub>dec</sub> )	Communication adapter
Product Code	0380 <sub>hex</sub> (896 <sub>dec</sub> )	Fronius FB Pro TwinEthernet/IP-2-Port
Product Name	Fronius-FB-Pro-Twin-EtherNetIP(TM)	

Image Type	Instance Type	Instance Name	Instance Description	Instance Number	Size [Byte]
Standard Image	Producing Instance	Input Data Standard	Data from power source to robot	104	60
	Consuming Instance	Output Data Standard	Data from robot to power source	154	60

# Setting the Bus Module IP Address

## Setting the Bus Module IP Address



You can set the bus module IP address as follows:

1. Using the DIP switch in the interface within the range defined by 192.168.0.xx (xx = DIP switch setting = 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 power source
2. On the website of the power source (if all positions of the DIP switch are set to the OFF position)

The IP address is set using DIP switch positions 1 to 6. The setting is in binary format. This results in a configuration range of 1 to 63 in decimal format.

DIP-Switch								IP 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

### Instructions for setting the IP address on the website of the power source (SmartManager):

Note down the IP address of the power source used:

- 1 On the power source control panel, select "Defaults"
- 2 On the power source control panel, select "System"
- 3 On the power source control panel, select "Information"
- 4 Note down the displayed IP address (example: 10.5.72.13)

Access the website of the power source in the internet browser:

- 5 Connect the computer to the network of the power source
- 6 Enter the IP address of the power source in the search bar of the Internet browser and confirm
- 7 Enter the standard user name (admin) and password (admin)
  - The website of the power source is displayed

Set the bus module IP address:

- 8 On the power source website, select the "RI FB PRO/i TWIN" tab

- 9 Enter the desired IP address for the interface under "Module configuration".  
For example: 192.168.0.12
- 10 Select "Set configuration"
- 11 Select "Restart module"
  - The set IP address is applied

# Input and output signals

---

## 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 as of firmware V1.8.0 of the RI FB PRO/i TWIN.

---

## Input signals (from robot to power source)

Address								
Relative			Absolute					
WORD	BYTE	BIT	BIT	Signal	Activity/ data type	Range	Factor	
0	0	0	0	Welding Start	Increasing			
		1	1	Robot ready	High			
		2	2	Working mode Bit 0	High	See following table <b>Value Range for Working Mode</b> on page 40		
		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	—					
	1		0	8	Gas on	Increasing		
			1	9	Wire forward	Increasing		
			2	10	Wire backward	Increasing		
			3	11	Error quit	Increasing		
			4	12	Touch sensing	High		
			5	13	Torch blow out	Increasing		
			6	14	Processline selection Bit 0 (only available for single-wire applications)	High	See following table <b>Value range Process line selection</b> on page 40	
7			15	Processline selection Bit 1 (only available for single-wire applications)	High			



Address							
Relative			Absolute				
WORD	BYTE	BIT	BIT	Signal	Activity/ data type	Range	Factor
1	2	0	16	Welding Simulation	High		
		1	17	—			
		2	18	—			
		3	19	—			
		4	20	—			
		5	21	—			
		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 sense start	Increasing		
6		30	Wire sense break	Increasing			
7	31	—					

Address							
Relative			Absolute				
WORD	BYTE	BIT	BIT	Signal	Activity/ data type	Range	Factor
2	4	0	32	Operating mode TWIN System Bit 0	High	See following table <b>Value range for Operating mode TWIN System</b> on page <b>40</b>	
		1	33	Operating mode TWIN System Bit 1	High		
		2	34	—			
		3	35	—			
		4	36	—			
		5	37	Documentation mode	High	See following table <b>Value range for Documentation mode</b> on page <b>40</b>	
		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, Power source 1	High			

Address							
Relative			Absolute				
WORD	BYTE	BIT	BIT	Signal	Activity/ data type	Range	Factor
3	6	0	48	—			
		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		
		5	61	ExtInput6 => OPT_Output 6	High		
6		62	ExtInput7 => OPT_Output 7	High			
7	63	ExtInput8 => OPT_Output 8	High				
4	8	0	64	—			
		1	65	—			
		2	66	—			
		3	67	—			
		4	68	—			
		5	69	—			
		6	70	—			
	7	71	Disable Process controlled correction, Power source 2	High			
	9	0	72	Contact tip short circuit detection on	High		
		1	73	—			
		2	74	—			
		3	75	—			
		4	76	—			
		5	77	—			
6		78	—				
7	79	—					

Address								
Relative			Absolute					
WORD	BYTE	BIT	BIT	Signal	Activity/ data type	Range	Factor	
5	10	0-7	80-87	—				
	11	0-7	88-95	—				
6	12	0-7	96-103	Welding characteristic- / Job number, Power source 1	UINT16	0 to 1000	1	
	13	0-7	104-111					
7	14	0-7	112-119	Welding characteristic- / Job number, Power source 2	UINT16	0 to 1000	1	
	15	0-7	120-127					
8	16, 17	0-7	128-143	<i>For the welding processes MIG/MAG pulse synergic, MIG/MAG standard synergic, MIG/MAG standard manual, MIG/MAG PMC, MIG/MAG LSC, CMT, ConstantWire:</i> <b>Wire feed speed command value, Power source 1</b>	SINT16	-327.68 to 327.67 [m/min]	100	
				<i>For job mode:</i> <b>Power correction, Power source 1</b>	SINT16	-20.00 to 20.00 [%]	100	
9	18, 19	0-7	144-159	<i>For the welding processes MIG/MAG pulse synergic, MIG/MAG standard synergic, MIG/MAG standard manual, MIG/MAG PMC, MIG/MAG LSC, CMT, ConstantWire:</i> <b>Wire feed speed command value, Power source 2</b>	SINT16	-327.68 to 327.67 [m/min]	100	
				<i>For job mode:</i> <b>Power correction, Power source 2</b>	SINT16	-20.00 to 20.00 [%]	100	

Address				Signal	Activity/ data type	Range	Factor
Relative			Absolute				
WORD	BYTE	BIT	BIT				
10	20, 21	0–7	160– 175	<p>For the welding processes MIG/MAG pulse synergic, MIG/MAG standard synergic, MIG/MAG PMC, MIG/MAG LSC, CMT:</p> <p><b>Arclength correction, Power source 1</b></p>	SINT16	-10.0 to 10.0 [steps]	10
				<p>For the welding process MIG/MAG standard manual:</p> <p><b>Welding voltage, Power source 1</b></p>	UINT16	0.0 to 6553.5 [V]	10
				<p>For job mode:</p> <p><b>Arclength correction, Power source 1</b></p>	SINT16	-10.0 to 10.0 [steps]	10
				<p>For the welding process ConstantWire:</p> <p><b>Hotwire current, Power source 1</b></p>	UINT16	0.0 to 6553.5 [A]	10
11	22, 23	0–7	176–191	<p>For the welding processes MIG/MAG pulse synergic, MIG/MAG standard synergic, MIG/MAG PMC, MIG/MAG LSC, CMT:</p> <p><b>Arclength correction, Power source 2</b></p>	SINT16	-10.0 to 10.0 [steps]	10
				<p>For the welding process MIG/MAG standard manual:</p> <p><b>Welding voltage, Power source 2</b></p>	UINT16	0.0 to 6553.5 [V]	10
				<p>For job mode:</p> <p><b>Arclength correction, Power source 2</b></p>	SINT16	-10.0 to 10.0 [steps]	10
				<p>For the welding process ConstantWire:</p> <p><b>Hotwire current, Power source 2</b></p>	UINT16	0.0 to 6553.5 [A]	10

Address									
Relative			Absolute						
WORD	BYTE	BIT	BIT	Signal	Activity/ data type	Range	Factor		
12	24, 25	0-7	192-207	For the welding processes MIG/MAG pulse synergic, MIG/MAG standard synergic, MIG/MAG PMC, MIG/MAG LSC, CMT:  <b>Pulse-/dynamic correction, Power source 1</b>	SINT16	-10.0 to 10.0 [steps]	10		
				For the welding process MIG/MAG standard manual:  <b>Dynamic, Power source 1</b>	UINT16	0.0 to 10.0 [steps]	10		
13	26, 27	0-7	208-223	For the welding processes MIG/MAG pulse synergic, MIG/MAG standard synergic, MIG/MAG PMC, MIG/MAG LSC, CMT:  <b>Pulse-/dynamic correction, Power source 2</b>	SINT16	-10.0 to 10.0 [steps]	10		
				For the welding process MIG/MAG standard manual:  <b>Dynamic, Power source 2</b>	UINT16	0.0 to 10.0 [steps]	10		
14	28	0-7	224-231	Wire retract correction, Power source 1	UINT16	0.0 to 10.0	10		
	29	0-7	232-239						
15	30	0-7	240- 247	Wire retract correction, Power source 2	UINT16	0.0 to 10.0	10		
	31	0-7	248- 255						
16	32	0-7	256-263	Welding speed	UINT16	0.0 to 1000 [m/min]	10		
	33	0-7	264-271						
17	34	0-7	272-279	Process controlled correction, Power source 1	SINT16	See table <b>Value range for Process controlled correction</b> on page 40			
	35	0-7	280- 287						
18	36	0-7	288- 295	Process controlled correction, Power source 2	SINT16				
	37	0-7	296- 303						
19	38	0-7	304- 311	Wire forward / backward length	UINT16			OFF / 1 to 65535 [mm]	1
	39	0-7	312-319						

Address				Signal	Activity/ data type	Range	Factor
Relative		Absolu- te	BIT				
WORD	BYTE	BIT					
20	40	0-7	320-327	Wire sense edge detection	UINT16	OFF / 0.5 to 20.0 [mm]	10
	41	0-7	328-335				
21	42	0-7	336- 343	—			
	43	0-7	344- 351				
22	44	0-7	352- 359	—			
	45	0-7	360- 367				
23	46	0-7	368- 375	—			
	47	0-7	376- 383				
24	48	0-7	384- 391	—			
	49	0-7	392- 399				
25	50	0-7	400- 407	—			
	51	0-7	408- 415				
26	52	0-7	416- 423	—			
	53	0-7	424- 431				
27	54	0-7	432- 439	—			
	55	0-7	440- 447				
28	56	0-7	448- 455	—			
	57	0-7	456- 463				
29	58	0-7	464- 471	Seam number	UINT16	0 to 65535	1
	59	0-7	472- 479				

**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	2-step MIG/MAG standard manual
1	0	0	0	1	Stop coolant pump

*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 Operating mode TWIN System**

Bit 1	Bit 0	Function power source 1	Function power source 2
0	0	Single mode	OFF
0	1	TWIN Lead	TWIN Trail
1	0	TWIN Trail	TWIN Lead
1	1	OFF	Single mode

*Value range for TWIN System Mode*

**Value range for Documentation mode**

Bit 0	Description
0	Seam number of power source (internal)
1	Seam number of robot (Word 29)

*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	-327.8 to +327.7 0.0 to +5.0	Volts	10

*Value range for process-dependent correction*



**Availability of the output signals**

The output signals listed below are available as of firmware V1.8.0 of the RI FB PRO/i TWIN.

**Output signals (from power source to robot)**

Address				Signal	Activity/ data type	Range	Factor	
Relative		Absolute						
WORD	BYTE	BIT	BIT					
0	0	0	0	Heartbeat Powersource	High/low	1 Hz		
		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	1	0	8	Collisionbox active	Low	0 = collision or cable break	
			1	9	Robot Motion Release, Power source 1	High		
			2	10	Wire stick workpiece	High		
			3	11	—			
			4	12	Short circuit contact tip	High		
			5	13	Parameter selection internally	High		
			6	14	—			
7	15	Torch body gripped	High					

Address							
Relative			Absolute				
WORD	BYTE	BIT	BIT	Signal	Activity/ data type	Range	Factor
1	2	0	16	Command value out of range	High		
		1	17	Correction out of range	High		
		2	18	—			
		3	19	Limitsignal, Power Source 1	High		
		4	20	—			
		5	21	—			
		6	22	Main supply status	Low		
	7	23	—				
	3	0	24	Sensor status 1, Power Source 1	High	See table <a href="#">Assignment of Sensor Statuses 1–4</a> on page <a href="#">46</a>	
		1	25	Sensor status 2, Power Source 1	High		
		2	26	Sensor status 3, Power Source 1	High		
		3	27	Sensor status 4, Power Source 1	High		
		4	28	—			
		5	29	—			
6		30	—				
2	4	0	32	—			
		1	33	—			
		2	34	—			
		3	35	Safety status Bit 0, Power Source 1	High		
		4	36	Safety status Bit 1, Power Source 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				Signal	Activity/ data type	Range	Factor
Relative		Absolute					
WORD	BYTE	BIT	BIT				
3	6	0	48	—			
		1	49	—			
		2	50	—			
		3	51	—			
		4	52	—			
		5	53	—			
		6	54	Gas nozzle touched	High		
	7	55	—				
	7	0	56	ExtOutput1 <= OPT_Input1	High		
		1	57	ExtOutput2 <= OPT_Input2	High		
		2	58	ExtOutput3 <= OPT_Input3	High		
		3	59	ExtOutput4 <= OPT_Input4	High		
		4	60	ExtOutput5 <= OPT_Input5	High		
		5	61	ExtOutput6 <= OPT_Input6	High		
6		62	ExtOutput7 <= OPT_Input7	High			
7	63	ExtOutput8 <= OPT_Input8	High				
4	8	0	64	—			
		1	65	Robot Motion Release, Power source 2	High		
		2	66	Limitsignal, Power source 2	High		
		3	67	—			
		4	68	—			
		5	69	—			
		6	70	—			
		7	71	—			
	9	0	72	—			
		1	73	—			
		2	74	—			
		3	75	—			
		4	76	—			
		5	77	—			
6		78	—				
7	79	—					

Address					Activity/ data type	Range	Factor
Relative		Absolute					
WORD	BYTE	BIT	BIT	Signal			
5	10	0	80	Sensor status 1, Power Source 2	High	See table <a href="#">Assignment of Sensor Statuses 1–4</a> on page <a href="#">46</a>	
		1	81	Sensor status 2, Power Source 2	High		
		2	82	Sensor status 3, Power Source 2	High		
		3	83	Sensor status 4, Power Source 2	High		
		4	84	—			
		5	85	—			
		6	86	—			
	11	0	88	—			
		1	89	—			
		2	90	—			
		3	91	Safety status Bit 0, Power Source 2	High		
		4	92	Safety status Bit 1, Power Source 2	High		
		5	93	—			
		6	94	—			
	7	95	—				
6	12	0–7	96–103	Welding voltage, Power source 1	UINT16	0.0 to 655.35 [V]	100
	13	0–7	104–111				
7	14	0–7	112–119	Welding voltage, Power source 2	UINT16	0.0 to 655.35 [V]	100
	15	0–7	120–127				
8	16	0–7	128–135	Welding current, Power source 1	UINT16	0.0 to 6553.5 [A]	10
	17	0–7	136–143				
9	18	0–7	144–151	Welding current, Power source 2	UINT16	0.0 to 6553.5 [A]	10
	19	0–7	152–159				
10	20	0–7	160–167	Wire feed speed, Power source 1	SINT16	-327.68 to 327.67 [m/min]	100
	21	0–7	168–175				
11	22	0–7	176–183	Wire feed speed, Power source 2	SINT16	-327.68 to 327.67 [m/min]	100
	23	0–7	184–191				
12	24	0–7	192–199	Actual real value for seam tracking	UINT16	0 to 6.5535	1000 0
	25	0–7	200–207				
13	26	0–7	208–215	Error number, Power source 1	UINT16	0 to 65535	1
	27	0–7	216–223				

Address				Signal	Activity/ data type	Range	Factor
Relative		Absolute					
WORD	BYTE	BIT					
14	28	0-7	224-231	Error number, Power source 2	UINT16	0 to 65535	1
	29	0-7	232-239				
15	30	0-7	240-247	Motor current M1, Power source 1	UINT16	-327.68 to 327.67 [A]	100
	31	0-7	248-255				
16	32	0-7	256-263	Motor current M1, Power source 2	UINT16	-327.68 to 327.67 [A]	100
	33	0-7	264-271				
17	34	0-7	272-279	Motor current M2, Power source 1	UINT16	-327.68 to 327.67 [A]	100
	35	0-7	280-287				
18	36	0-7	288-295	Motor current M2, Power source 2	UINT16	-327.68 to 327.67 [A]	100
	37	0-7	296-303				
19	38	0-7	304-311	Motor current M3, Power source 1	UINT16	-327.68 to 327.67 [A]	100
	39	0-7	312-319				
20	40	0-7	320-327	Motor current M3, Power source 2	UINT16	-327.68 to 327.67 [A]	100
	41	0-7	328-335				
21	42	0-7	336-343	Warning,, Power Source 1	UINT16	0 to 65535	1
	43	0-7	344-351				
22	44	0-7	352-359	Warning,, Power source 2	UINT16	0 to 65535	1
	45	0-7	360-367				
23	46	0-7	368-375	Wire position, Power source 1	UINT16	-327.68 to 327.67 [mm]	100
	47	0-7	376-383				
24	48	0-7	284-291	Wire position, Power source 2	UINT16	-327.68 to 327.67 [mm]	100
	49	0-7	292-399				
25	50	0-7	400-407	—			
	51	0-7	408-415				
26	52	0-7	416-423	—			
	53	0-7	424-431				
27	54	0-7	432-439	—			
	55	0-7	440-447				
28	56	0-7	448-455	—			
	57	0-7	456-463				
29	58	0-7	464-471	—			
	59	0-7	472-479				

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**Assignment of  
Sensor Statuses  
1-4**

<b>Signal</b>	<b>Description</b>
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)





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