

RCI Can

Brugsanvisning

micatronic

Migatronics RCI er et generelt interface til styring og overvågning af SIGMA via de mest anvendte industri busser. RCI enheden kan konfigureres til at understøtte en række forskellige funktioner.

1. RCI varetager konvertering mellem den interne SIGMA CAN-protokol og de mest benyttede industri busser.
2. Robot interface enheden er galvanisk isoleret fra SIGMA.

Installation af robot interface og robot skal altid gennemføres med forsyningsspændingen slukket på alle enheder, da der ellers kan opstå funktionsfejl.



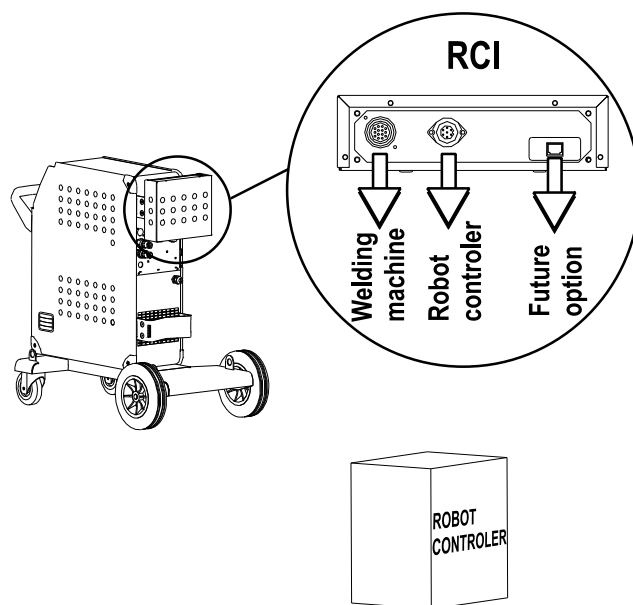
Bortskaf produktet i overensstemmelse med gældende regler og forskrifter.
www.migatronik.com/goto/weee

Maskinkoncept

SIGMA robotinterfacet er designet til automatiseret svejsning. Interfacet er beregnet til placering bag på SIGMA eller et vilkårligt sted på kundens udstyr.

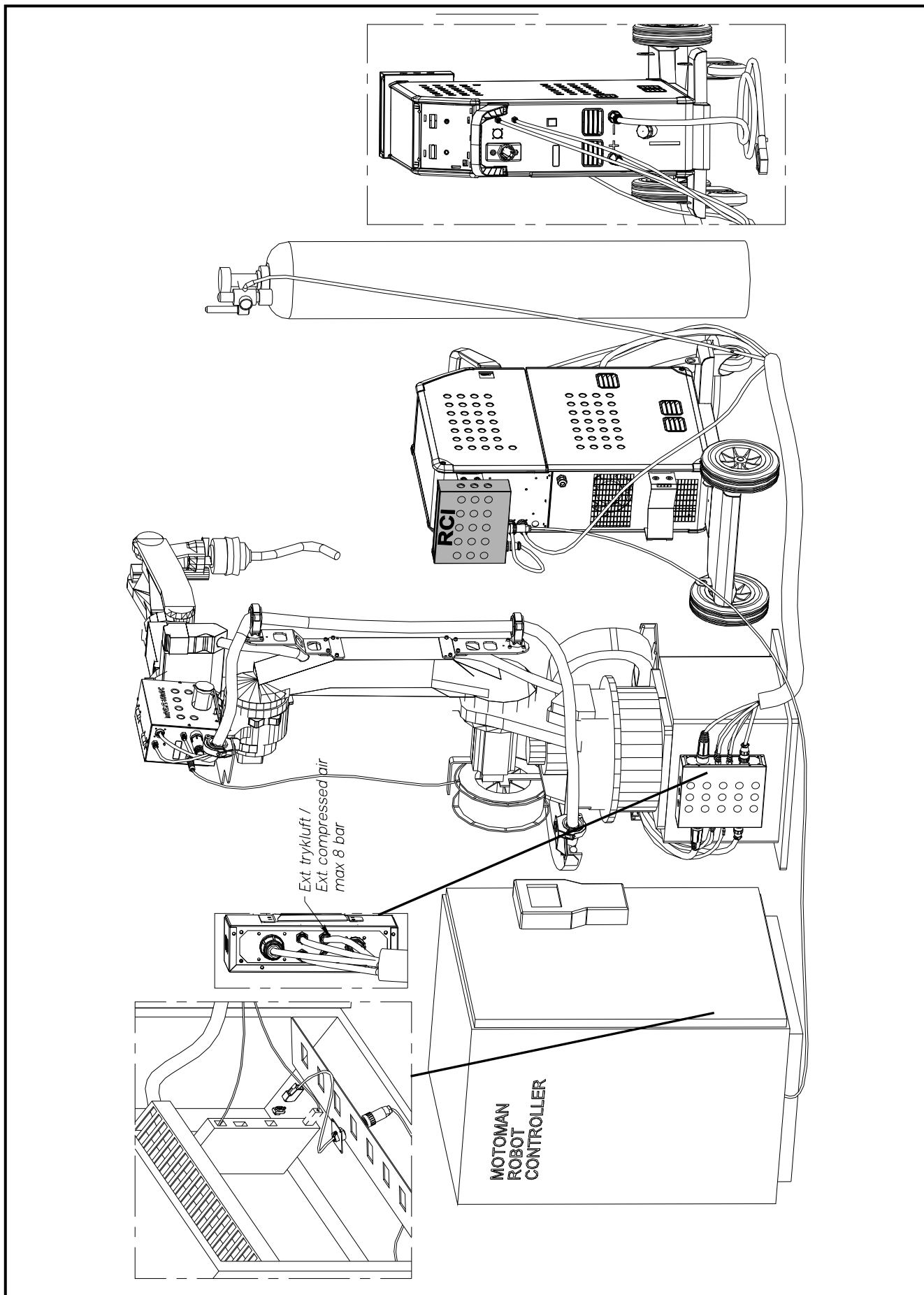
Robotinterfacet forbindes til maskinen via et can-bus kabel (varenr.: 74340016). Strømkilden skal i forvejen være udstyret med et ekstra can-stik.

Robotinterfacet forbindes til robotten med et kabel, der passer til den benyttede industribus.



Index	Side
1. Systemoversigt	4
2. MOTOMAN	5
2.1 RCI CANopen	5
2.1.1 Montering og konfiguration	5
2.1.2 Parameteroversigt.....	6
2.1.3 Robotprogram eksempler	8
3. Komponentplacering	9
4. Fejlindikation.....	11
Appendix A: Parametre, detaljeret beskrivelse..	12
Appendix B: Welding Process Signals	19

1. Systemoversigt



2. MOTOMAN

2.1 RCI CANopen

2.1.1 Montering og konfiguration

RCI CANopen kan anvendes sammen med MOTOMAN NX100 robot controller, monteret med XFB01/CANopen slave interface board.

RCI skal være konfigureret med konfigurationsfil for MOTOMAN robot med varenummer xxxxxxxx.

XFB01/CANopen skal indstilles til følgende:

Baudrate : 250

Node address : 3

For montering og indstilling af XFB01/CANopen henvises til MOTOMAN manual:
Motoman NX100 Controller
Fieldbus (XFB01)
Instruction Manual
Optional Anybus Interface Board
Partnumber 147380-2

RCI forbindes til XFB01/CANopen med kabel (varenr.: 74340021)

Herefter vil der være adgang til at kontrollere svejsemaskinens indstillinger og kommandoer som beskrevet i Tabel 1

Detaljeret beskrivelse af kommandoer og indstillinger findes i Appendix A

2.1.2 Parameteroversigt

Tabel 1: MOTOMAN RCI CANopen status og kommandoer

Robot Sends												Robot Receives											
Index		Sub index		Ext. Output		OG#		Scale		MigaOpen		Index		Sub index		Ext. Input		IG#		Scale			
										Index	Sub												
Bit mapped Sigma commands #0	10	0	TPDO 1	Byte 0	2101	01	(0x01)	30070	5	10	2	RPDO 1	Byte 0	2103	01	(0x01)	20070	5	See detail sheet				
Bit mapped Sigma settings #0	10	1	Byte 1	Byte 1	2102	01	(0x01)	30080	6	10	5	Byte 1	Byte 1	2106	01	(0x01)	20080	6	1-9				
Bit mapped robot status #0	10	3	Byte 2	Byte 2	2104	01	(0x01)	30090	7	10	14	Byte 2	Byte 2	2110	01	(0x01)	20090	7	0-254				
Select sequence	10	4	Byte 3	Byte 3	2105	01	(0x01)	30100	8	10	13	Byte 3	Byte 3	210F	01	(0x01)	20100	8	See detail sheet				
Select Wirefeeder	10	12	Byte 4	Byte 4	210D	01	(0x01)	30110	9			Byte 4	Byte 4				20110	9					
			Byte 5	Byte 5				30120	10			Byte 5	Byte 5				20120	10					
			Byte 6	Byte 6				30130	11			Byte 6	Byte 6				20130	11					
			Byte 7	Byte 7				30140	12			Byte 7	Byte 7				20140	12					
Select welding process	10	6	TPDO 2	Byte 0	2107	01	(0x01)	30150	13	10	11	RPDO 2	Byte 0	210C	01	(0x01)	20150	13	See chart for machine				
Set welding current	10	8	Byte 1	Byte 1	2109	01	(0x01)	30160	14	10	10	Byte 1	Byte 1	210B	01	(0x01)	20160	14	1/10 amps				
Set voltage trim	10	7	Byte 2	Byte 2	2108	01	(0x01)	30170	15	10	9	Byte 2	Byte 2	210A	01	(0x01)	20170	15	1/10 volts-9..+9.9 (50%..100%..150%)				
			Byte 3	Byte 3				30180	16			Byte 3	Byte 3				20180	16					
			Byte 4	Byte 4				30190	17			Byte 4	Byte 4				20190	17					
			Byte 5	Byte 5				30200	18			Byte 5	Byte 5				20200	18					
Illegal area												Illegal area											
			Byte 6	Byte 6								Byte 6	Byte 6										
			Byte 7	Byte 7								Byte 7	Byte 7										

Tabel 1a: MOTOMAN RCI CANopen status og kommandoer, details

Robot Sends										Robot Receives									
Index		Sub index		Ext. Output		OGH#		OG#		Index		Sub index		Ext. Input		INH#		IGH#	
TPDO 1	Byte 0	2000	01	(0x01)	30070	33			33	RPDO 1	Byte 0	2100	01	(0x01)	20070	33			33
Bit mapped Sigma commands #0 (10,0)										Bitmapped Sigma status #0 (10,2)									
	Trig (0=Not trigged, 1=Trigged)	1			30071	34					Communication status (0=Not ready, 1=Ready)	1			20071	34			
	Wire Inch Forward (0=Stop, 1=Inch forward)	2			30072	35			9		Power source status (0=Not ready, 1=Ready)	2			20072	35			9
	Wire Inch Retract (0=Stop, 1=Inch Retract)	3			30073	36					Arc status (0=OFF, 1=ON)	3			20073	36			
	Gas test (0=Close, 1=Open)	4			30074	37					Gas status (0=OFF, 1=ON)	4			20074	37			
	Welding Simulation (0=Normal, 1=Simulate)	5			30075	38			10		Trig status (0=Not trigged, 1=Trigged)	5			20075	38			10
	Air Clean Valve (0=CLOSE, 1=OPEN)	6			30076	39					Puls Mode Status (0=No Puls, 1=Puls)	6			20076	39			
		7			30077	40					DUO Plus Mode Status (0=No DUO Plus, 1=DUO Plus)	7			20077	40			
											Toggle Bit (Toggles for each transmission of status)								
Bit mapped Sigma settings #0 (10,1)										Bitmapped Sigma status #1 (10,3)									
	Pulse mode select (0=Normal, 1=Puls)	1	2000	02	(0x02)	30080	41				RPDO 1	Byte 1	2100	02	(0x02)	20080	41		
	DUO plus mode select (0=Normal, 1=DUOplus)	2			30081	42			11		Communication status (0=Not ready, 1=Ready)	1			20081	42			11
		3			30082	43					Power source status (0=Not ready, 1=Ready)	2			20082	43			
		4			30083	44					Arc status (0=OFF, 1=ON)	3			20083	44			
		5			30084	45					Gas status (0=OFF, 1=ON)	4			20084	45			
		6			30085	46			12		Trig status (0=Not trigged, 1=Trigged)	5			20085	46			12
		7			30086	47					DUO Plus Mode Status (0=No DUO Plus, 1=DUO Plus)	6			20086	47			
					30087	48					Toggle Bit (Toggles for each transmission of status)	7			20087	48			
Bit mapped robot status #0 (10,2)										Bitmapped Sigma status #1 (10,3)									
	Robot status (0=Not ready, 1=Ready)	1	2000	03	(0x03)	30090	49				RPDO 1	Byte 2	2100	03	(0x03)	20090	49		
	Enable Commands (0=Disabled, 1=Enabled)	2			30091	50			13		Communication status (0=Not ready, 1=Ready)	1			20091	50			13
	Enable Primary Settings (0=Disabled, 1=Enabled)	3			30092	51					Power source status (0=Not ready, 1=Ready)	2			20092	51			
	Enable Secondary Settings (0=Disabled, 1=Enabled)	4			30093	52					Arc status (0=OFF, 1=ON)	3			20093	52			
		5			30094	53					Gas status (0=OFF, 1=ON)	4			20094	53			
		6			30095	54					Trig status (0=Not trigged, 1=Trigged)	5			20095	54			
		7			30096	55					DUO Plus Mode Status (0=No DUO Plus, 1=DUO Plus)	6			20096	55			
					30097	56					Toggle Bit (Toggles for each transmission of status)	7			20097	56			
Bitmapped Sigma status #1 (10,3)										Bitmapped Sigma status #1 (10,3)									
	Air Clean Valve Status (0=CLOSED, 1=OPEN)	1	2100	04	(0x04)	20100	57				RPDO 1	Byte 3	2100	04	(0x04)	20100	57		
		2			20101	58					Communication status (0=Not ready, 1=Ready)	1			20101	58			15
		3			20102	59					Power source status (0=Not ready, 1=Ready)	2			20102	59			
		4			20103	60					Arc status (0=OFF, 1=ON)	3			20103	60			
		5			20104	61					Gas status (0=OFF, 1=ON)	4			20104	61			
		6			20105	62					Trig status (0=Not trigged, 1=Trigged)	5			20105	62			
		7			20106	63					DUO Plus Mode Status (0=No DUO Plus, 1=DUO Plus)	6			20106	63			
					20107	64					Toggle Bit (Toggles for each transmission of status)	7			20107	64			

2.1.3 Robotprogram eksempler

Examples:

Selecting a welding process.

The welding process is selected by writing a word size value to the relevant OG# in the communication area of the NX100.

This can be done by writing to the high and low byte of the word like this:

$$\begin{aligned} \text{OG\#(14)} &= \text{Trunc}(\text{"Desired Welding Process"} / 256) \\ \text{OG\#(13)} &= \text{"Desired Welding Process"} - (\text{OG\#(14)} * 256) \end{aligned}$$

Example:

"Desired Welding Process" = 712

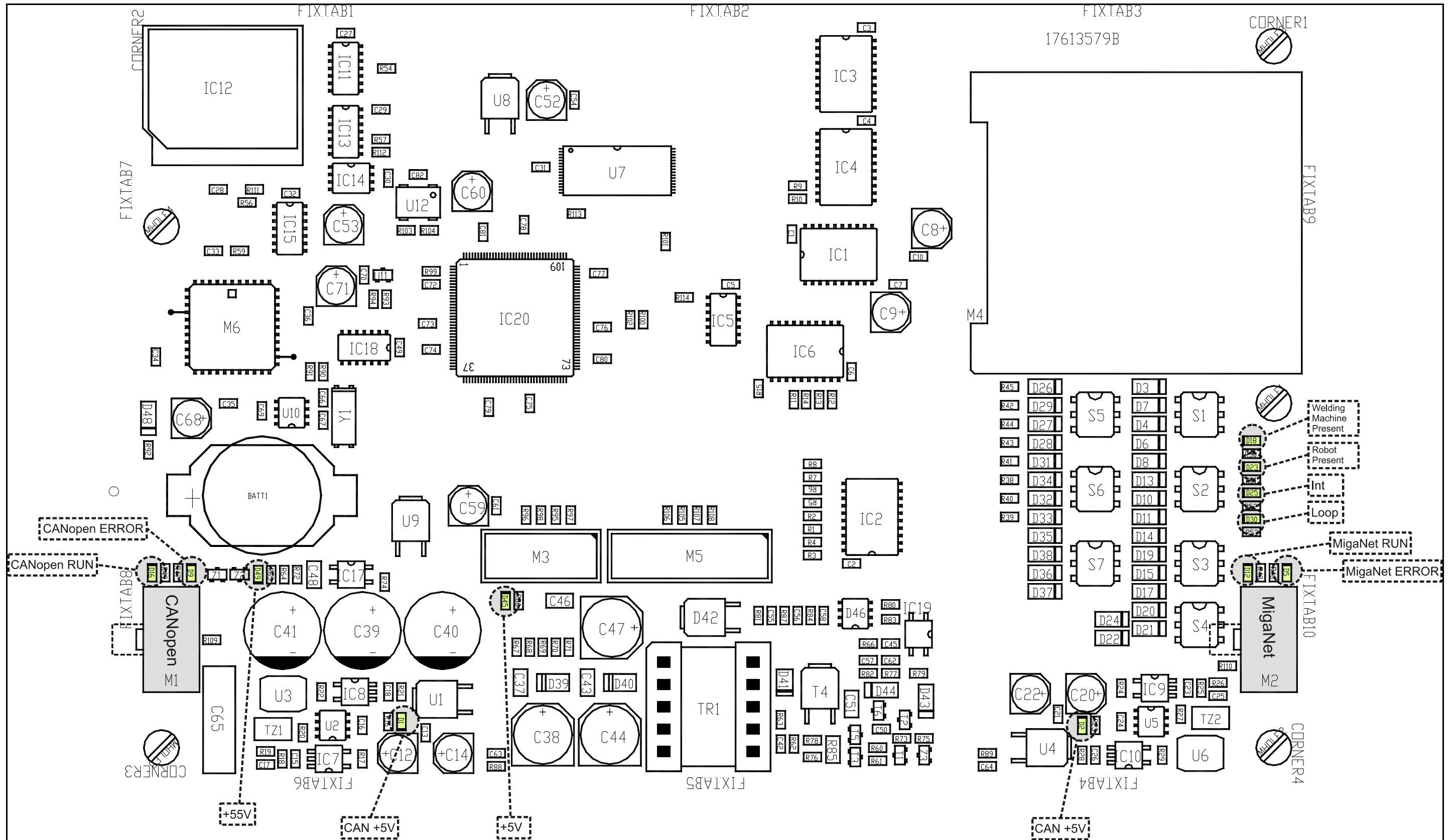
$$\begin{aligned} \text{OG\#(14)} &= \text{Truncate}(712 / 256) = \text{Truncate}(2.781250) = \underline{2} \\ \text{OG\#(13)} &= 712 - (2 * 256) = 712 - 512 = \underline{200} \end{aligned}$$

To ensure that the value is actually transmitted it is recommended to first set the output groups to 0 and then to the desired welding process value.

Below is an example:

```
/JOB
//NAME P712
//POS
///NPOS 0,0,0,0,0,0
//INST
///DATE 2009/03/02 12:35
///COMM SELECTS PROCES 712
///ATTR SC,RW
///GROUP1 RB1
NOP
DOUT OG#(13) 0
DOUT OG#(14) 0
TIMER T=0.20
DOUT OG#(13) 200
DOUT OG#(14) 2
TIMER T=0.20
END
```


3. Komponentplacering



4. Fejlindikation

(lysdioder)

Normal tilstand:

Loop	:	Hurtigt blink
Int	:	Langsomt blink
Robot Present	:	Tændt
Welding machine present	:	Tændt
CANopen RUN	:	Tændt
CANopen ERROR	:	Slukket
MigaNet RUN	:	Slukket
MigaNet ERROR	:	Slukket

Generel systemfejl:

CANopen RUN	:	Blinker
CANopen ERROR	:	Blinker
MigaNet RUN	:	Blinker
MigaNet ERROR	:	Blinker

CANopen fejl:

CANopen RUN	:	Se CiA 303-3
CANopen ERROR	:	Se CiA 303-3

Appendix A:

Parametre, detaljeret beskrivelse

Behavior related parameters:

<i>Name:</i>	Robot Status
<i>Description:</i>	This parameter must be set to "ON" before the robot starts sending commands or settings to the welding machine.
<i>Restrictions:</i>	
<i>Unit:</i>	Binary
<i>Range:</i>	"OFF", "ON"

<i>Name:</i>	Enable Commands
<i>Description:</i>	This parameter must be set to "ON" before the welding machine accepts robot control of the commands: "Trig" "Wire Inch Forward" "Wire Inch Reverse" "Gas Test"
<i>Restrictions:</i>	
<i>Unit:</i>	Binary
<i>Range:</i>	"OFF", "ON"

<i>Name:</i>	Enable Primary Settings
<i>Description:</i>	This parameter must be set to "ON" before the welding machine accepts robot control of the settings: "Select Welding Process" "Select Sequence"
<i>Restrictions:</i>	
<i>Unit:</i>	Binary
<i>Range:</i>	"OFF", "ON"

<i>Name:</i>	Enable Secondary Settings
<i>Description:</i>	This parameter must be set to "ON" before the welding machine accepts robot control of the settings: "Set Welding Current" "Set Voltage Trim" "Pulse Mode Select" "DUO Plus Mode Select"
<i>Restrictions:</i>	
<i>Unit:</i>	Binary
<i>Range:</i>	"OFF", "ON"

<i>Name:</i>	Welding Simulation
<i>Description:</i>	This command instructs to only simulate welding when triggered. No Arc will occur, Gas valve will not open and Wire will not be fed.
<i>Restrictions:</i>	Not available on all machines. Do not issue while welding. Do not issue while Inching forward (Inch Forward)
<i>Unit:</i>	Binary
<i>Range:</i>	"OFF", "ON"

Settings:

<i>Name:</i>	Select Welding Process
<i>Description:</i>	Selects a welding process (welding program) on the welding machine. Please see the chart for the specific machine.
<i>Restrictions:</i>	A 200ms delay <u>must</u> be implemented after each Welding Process Selection. Alternatively a “wait IG#” may be used. Depends on welding packages installed in the welding machine. “Enable Primary Settings” must be set to “ON”
<i>Unit:</i>	Integer
<i>Range:</i>	1-999

<i>Name:</i>	Select Sequence
<i>Description:</i>	Selects a sequence on the welding machine.
<i>Restrictions:</i>	Depends on welding packages installed in the welding machine. A matching number of sequences must be configured on the welding machine. “Enable Primary Settings” must be set to “ON”
<i>Unit:</i>	Integer
<i>Range:</i>	1-9

<i>Name:</i>	Select Wirefeeder
<i>Description:</i>	Selects a Wirefeeder
<i>Restrictions:</i>	Welding machine will display an error if a non-existing is selected. Internal wirefeeder is #0, External wirefeeder # depends on configuration. “Enable Primary Settings” must be set to “ON”
<i>Unit:</i>	Integer
<i>Range:</i>	0-254

<i>Name:</i>	Pulse mode select
<i>Description:</i>	Selects pulse mode on welding machine.
<i>Restrictions:</i>	“Enable Secondary Settings” must be set to “ON”
<i>Unit:</i>	Binary
<i>Range:</i>	“OFF”, “ON”

<i>Name:</i>	DUO plus mode select
<i>Description:</i>	Selects DUO plus mode on welding machine.
<i>Restrictions:</i>	“Enable Secondary Settings” must be set to “ON”
<i>Unit:</i>	Binary
<i>Range:</i>	“OFF”, “ON”

<i>Name:</i>	Set Welding Current
<i>Description:</i>	Sets the welding current on the welding machine.
<i>Restrictions:</i>	Depends on welding packages installed in the welding machine. “Enable Secondary Settings” must be set to “ON”
<i>Unit:</i>	1/10 of amperes.
<i>Range:</i>	1-9999 (0.1 – 999.9 ampere)

<i>Name:</i>	Set Voltage Trim
<i>Description:</i>	Sets the trim voltage on the welding machine.
<i>Restrictions:</i>	Depends on welding packages installed in the welding machine. "Enable Secondary Settings" must be set to "ON"
<i>Unit:</i>	1/10 of volts.
<i>Range:</i>	50%..150% (equals -9.9..+9.9 volt)

Commands:

<i>Name:</i>	Trig
<i>Description:</i>	This command instructs the welding machine to start or stop welding assuming that the welding machine has been configured correctly.
<i>Restrictions:</i>	"Enable Commands" must be set to "ON"
<i>Unit:</i>	Binary
<i>Range:</i>	"OFF", "ON"

<i>Name:</i>	Wire Inch Forward
<i>Description:</i>	This command instructs the welding machine to activate the wire drive motor and inch forward.
<i>Restrictions:</i>	Do not issue while welding. Do not issue while Retracting (Inch Retract). "Enable Commands" must be set to "ON"
<i>Unit:</i>	Binary
<i>Range:</i>	"OFF", "ON"

<i>Name:</i>	Wire Inch Retract
<i>Description:</i>	This command instructs the welding machine to activate the wire drive motor and retract the wire.
<i>Restrictions:</i>	Not possible on all wirefeeders. Do not issue while welding. Do not issue while Inching forward (Inch Forward) "Enable Commands" must be set to "ON"
<i>Unit:</i>	Binary
<i>Range:</i>	"OFF", "ON"

<i>Name:</i>	Gas Test
<i>Description:</i>	This command instructs the welding machine to open the gas valve.
<i>Restrictions:</i>	Do not issue while welding. Do not issue while Inching forward (Inch Forward). "Enable Commands" must be set to "ON"
<i>Unit:</i>	Binary
<i>Range:</i>	"OFF", "ON"

Status:

<i>Name:</i>	Actual Welding Process
<i>Description:</i>	Reflects the current welding process (welding program) on the welding machine. Please see the chart for the specific machine.
<i>Restrictions:</i>	Depends on welding packages installed in the welding machine.
<i>Unit:</i>	Integer
<i>Range:</i>	1-999

<i>Name:</i>	Actual Sequence
<i>Description:</i>	Reflects the current sequence on the welding machine.
<i>Restrictions:</i>	
<i>Unit:</i>	Integer
<i>Range:</i>	1-9

<i>Name:</i>	Actual Welding Current
<i>Description:</i>	Reflects the actual welding current while welding.
<i>Restrictions:</i>	
<i>Unit:</i>	1/10 of amperes.
<i>Range:</i>	1-9999 (0.1 – 999.9 ampere)

<i>Name:</i>	Actual Voltage
<i>Description:</i>	Reflects the actual welding voltage while welding
<i>Restrictions:</i>	
<i>Unit:</i>	1/10 of volts.
<i>Range:</i>	

<i>Name:</i>	Communication status
<i>Description:</i>	Reflects the status of the bus communication between the robot controller and the welding machine.
<i>Restrictions:</i>	
<i>Unit:</i>	Binary
<i>Range:</i>	“Not Ready”, “Ready”

<i>Name:</i>	Power Source status
<i>Description:</i>	Reflects the status of the welding machine. When the welding machine is ready to weld the status will be "Ready". In case of errors the status will be set to "Not Ready"
<i>Restrictions:</i>	
<i>Unit:</i>	Binary
<i>Range:</i>	"Not Ready", "Ready"

<i>Name:</i>	Arc status
<i>Description:</i>	Reflects the status of the arc.
<i>Restrictions:</i>	
<i>Unit:</i>	Binary
<i>Range:</i>	"OFF", "ON"

<i>Name:</i>	Gas status
<i>Description:</i>	Reflects the status of the gas valve.
<i>Restrictions:</i>	
<i>Unit:</i>	Binary
<i>Range:</i>	"Closed", "Open"

<i>Name:</i>	Trig status
<i>Description:</i>	Reflects the trig status of the welding machine.
<i>Restrictions:</i>	
<i>Unit:</i>	Binary
<i>Range:</i>	"Not trigged", "Trigged"

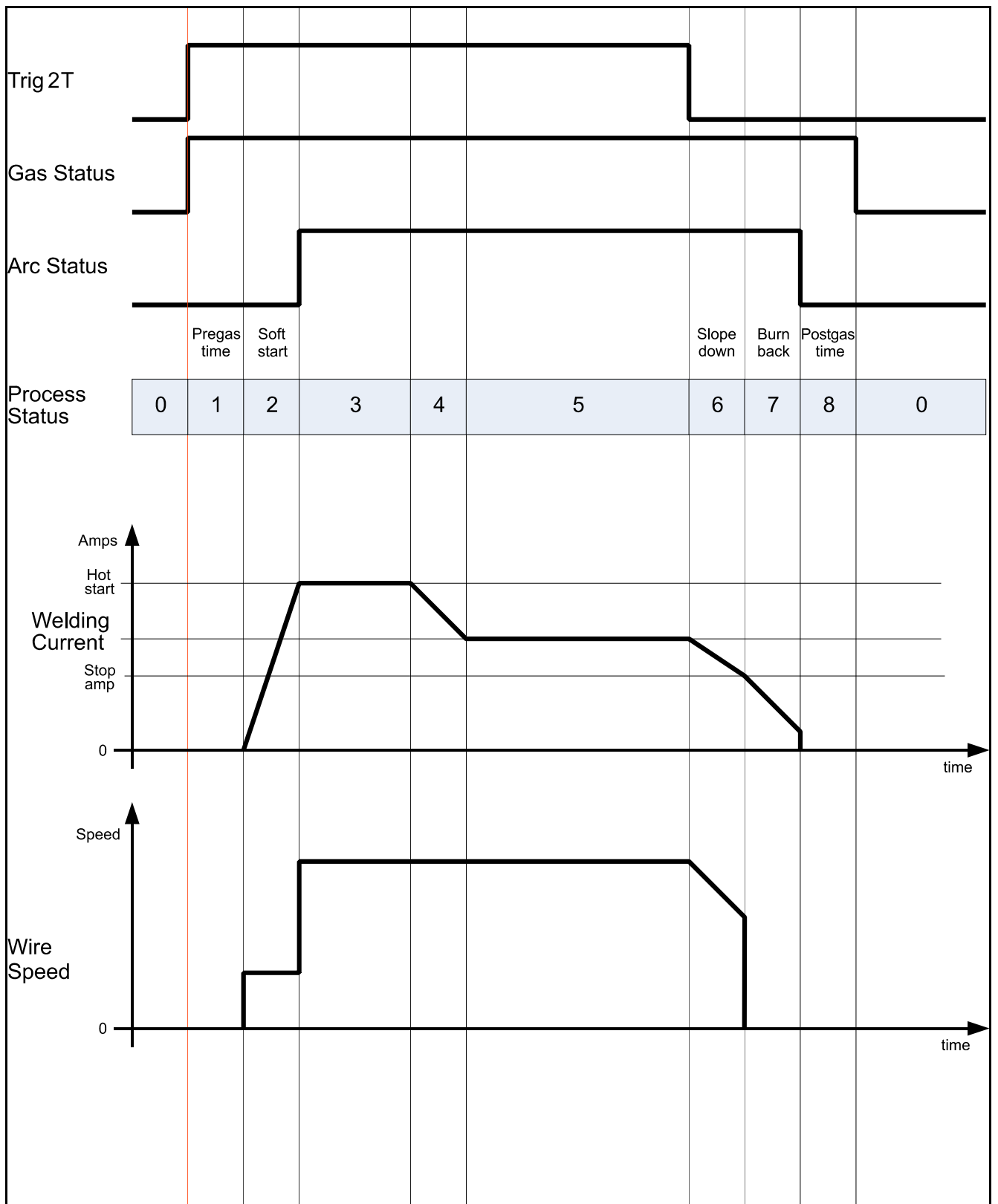
<i>Name:</i>	Pulse mode status
<i>Description:</i>	Reflects the pulse mode status on th welding machine.
<i>Restrictions:</i>	
<i>Unit:</i>	Binary
<i>Range:</i>	"Puls disabled", "Puls enabled"

<i>Name:</i>	DUO plus mode status
<i>Description:</i>	Reflects the pulse mode status on th welding machine.
<i>Restrictions:</i>	
<i>Unit:</i>	Binary
<i>Range:</i>	"DUO plus disabled", "DUO plus enabled"

<i>Name:</i>	Toggle Bit
<i>Description:</i>	Toggles its value with a 2 second interval or when a transmission of the status byte is made.
<i>Restrictions:</i>	
<i>Unit:</i>	Binary
<i>Range:</i>	"0", "1"

Appendix B

Welding Process Signals



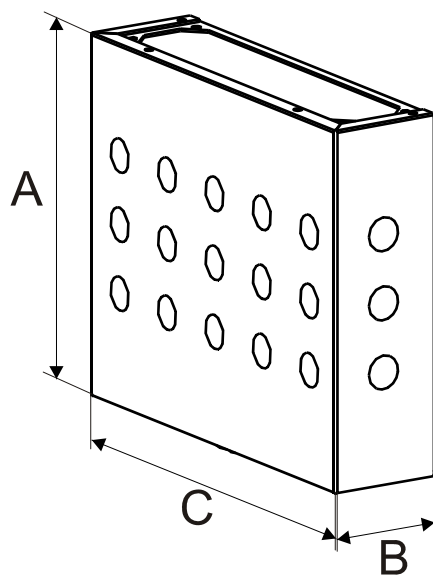
Specifikationer

Mekaniske:

Kabinet mål (AxBxC) : 223,5x73x263,5 mm
Tæthedsklasse : IP21

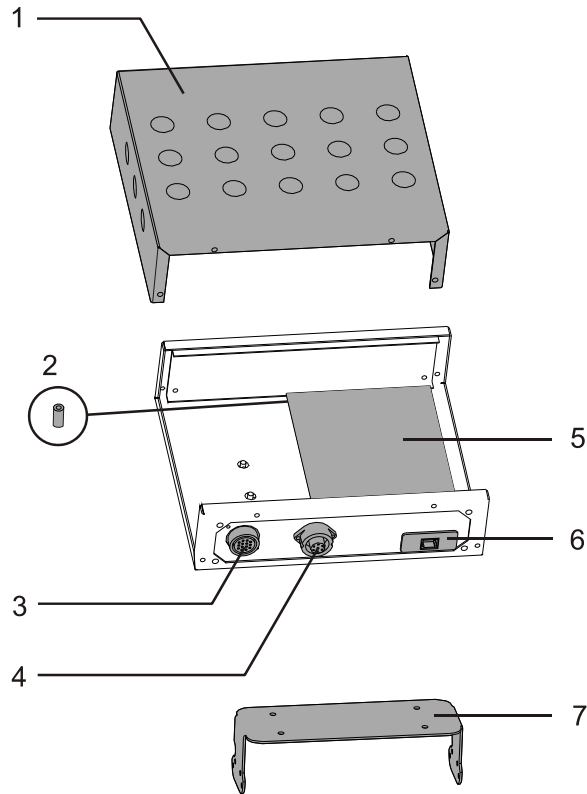
Elektriske:

Forsyning : 55VDC fra svejsemaskine



Reservedelsliste
Spare parts list
Ersatzteilliste
Liste des pièces de rechange

RCI



Pos.	No.	Varebetegnelse Warenbezeichnung	Description of goods Désignation des pièces
1	24433696	Låg Deckel	Cover Couvercle
2	26150039	Afstandsør Abstandsstück	Spacer
3	71613481	Print m/stik Platine mit Vielfachstecker	PCB with multiplug Carte de circuits imprimé avec multibroche
3a	17200038	Multistik 14-pol Vielfachstecker 14-polig	Multiplug 14-pole Prise multibroche 14-pôle
4	74471364	Ledningssæt Leitungsbündel	Wire harness Ensemble de filerie
5	71613579	Print, CANOpen CPU Platine, CANOpen CPU	PCB , CANOpen CPU Carte de circuits imprimé, CANOpen CPU
6	45050372	Blindprop Blindstöpfel	Blind plug Bouchon de couverture
7	24611790	Monteringsbeslag Befestigungsbeslag	Mounting fittings Console de montage

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