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## Sommario

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# MDI\_P1R44F-024: Installer Manual

## 1. Information

### 1.1 Release



Quality in Electronic  
Manufacturing

<b>Document:</b>	mdi_p1r44f-024		
<b>Description:</b>	Installation Manual p1r44f-024		
<b>Editor:</b>	Andrea Zarantonello		
<b>Approver:</b>	Giuliano Tognon		
<b>Link:</b>	<a href="https://www.qem.eu/doku/doku.php/strumenti/qmoveplus/c1r44/p1r44f-024/mdi_p1r44f-024">https://www.qem.eu/doku/doku.php/strumenti/qmoveplus/c1r44/p1r44f-024/mdi_p1r44f-024</a>		
<b>Language:</b>	English		
<b>Document Release</b>	<b>Description</b>	<b>Notes</b>	<b>Date</b>
01	New manual		12/22/2023

## Specifications

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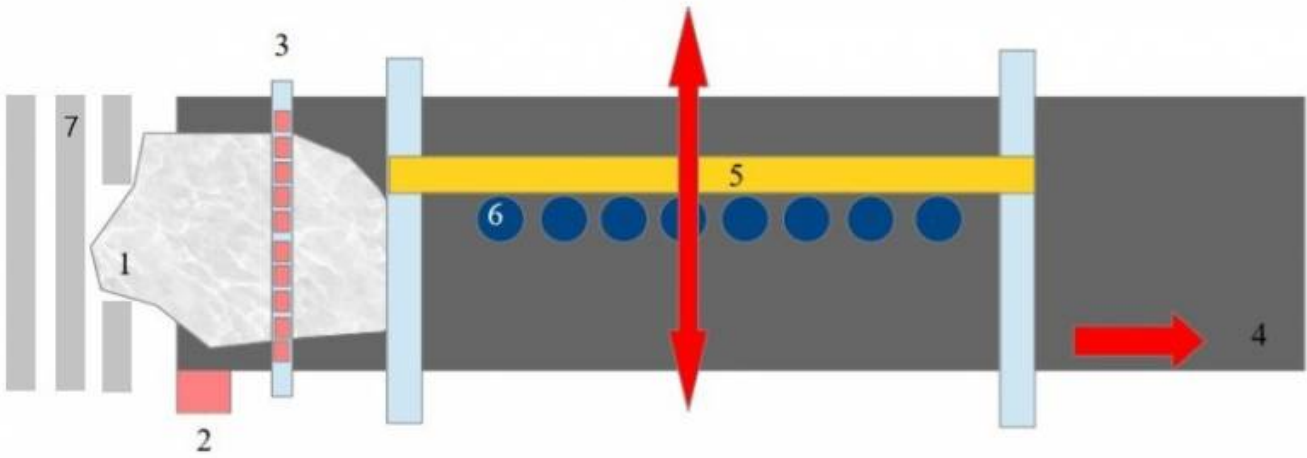
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## 2. Setup

### 2.1 Machine Overview

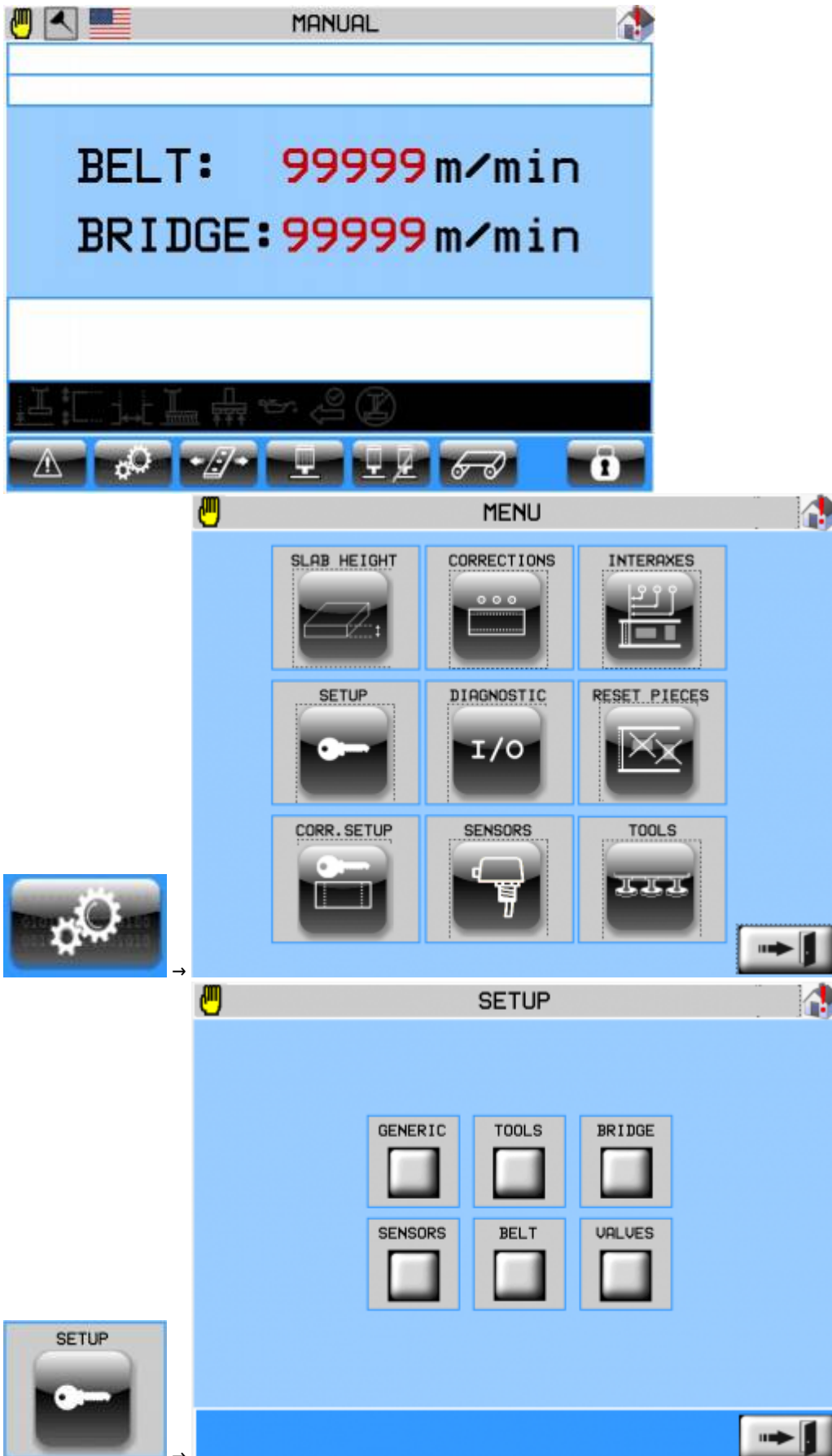
Machine top view:



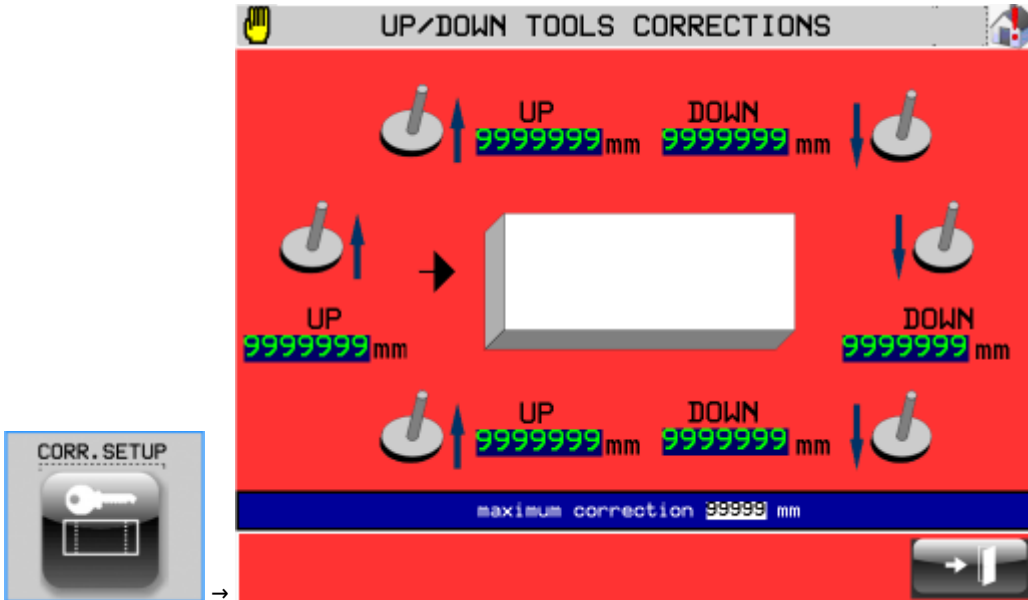
n:	Description:
1	Raw Slab
2	Conveyor Belt Encoder
3	Limit Switch Bar
4	Conveyor Belt
5	Moving Bridge
6	Polishing Heads
7	Infeed Roller

## 2.2 Access to Setup

Access to the setup can be done from the MENU page by entering the password **035**.









There is a dedicated setup for the correction of the head up/down movement, accessible by entering the password **123**.



## 2.2.1 Introduction to SETUP

List of parameters divided into

<b>GENERIC</b> 	general parameters
<b>TOOLS</b> 	parameters associated with the heads
<b>BRIDGE</b> 	parameters associated with the bridge
<b>SENSORS</b> 	parameters associated with the sensor bar
<b>BELT</b> 	parameters associated with the conveyor belt
<b>VALVES</b> 	parameters associated with the head up/down valves

## 2.3 Generic Setup



### GENERIC



PG01: LANGUAGE	ENG	PG16: TIME PRE-START	999999 s
PG02: MAX CORRECTIONS	99999 mm	PG17: LUBRIF. TIME ON	999999 s
PG03: DECIMAL POINT	99999	PG18: LUBRIF. TIME OFF	999999 min
PG04: TIMEOUT PART.LIFT	999 s	PG19: ENGINES TIME ON	999999 s
PG05: HORIZONTAL STEP	9999999 mm	PG20: ENGINES TIME OFF	999999 s
PG06: ORTHOGONAL STEP	9999999 mm	PG21: TIME ENGINE OFF	
PG07: ENABLE SLAVE BRIDGE	OFF	ON EXIT BELT	9999999 s
PG08: LINE MEASURE	9999999 mm	PG22: WARNING ABR.THICK	9999999 mm
PG09: LINE PULSE	9999999	PG23: ALARM ABR.THICK	9999999 mm
PG10: SLAB IN	LEFT	PG24: TIMEOUT ABRAS.ALM	9999999 ms
PG11: SELFLEARN BRIDGE	OFF	PG25: HEADS OUTPUT	CONST
PG12: ENABLE ABR MANAGEM.	OFF	PG26: LINE OUTPUT	CONST
PG13: TOOLS NUMBER	OFF	PG27: PULSE TIME	9999999 s
PG14: DIS. HEADS	TOUCH	PG28: LINE DELAY	9999999 s
PG15: SELECTOR AUTO/MAN	OFF	PG29: MAX SLAB HEIGHT	99999 mm
		PG30: BRUSH EARLY	9999999 mm
		PG31: BRUSH DELAY	9999999 mm
		PG32: REFERENCE VEL	9999999 m/s
		PG34: RAMP TYPE	LINEAR
		PG35: EDGE-HEAD DIST	9999999 mm
		PG36: BRIDGE-HEAD DIST	9999999 mm
		PG37: HEIGHT SENS.DIST	9999999 mm

99 : 99 : 99      99 / 99 / 9999



Parameter Name	Unit of Measurement	Default	Range	Description
PG01 : LANGUAGE	-	ITA	1 ÷ 2	1: ITALIAN 2: ENGLISH
PG02 : MAX CORRECTIONS	mm	0	0-9999	Maximum correction applicable for head up and down movement
PG03 : DECIMAL POINT	-	1	0 ÷ 3	It is the position of the decimal point in the display of measurements.
PG04 : PARTIAL UP TIMOUT	s	0	99.9	Timer after which the heads lift from a partial up movement.
PG05 : HORIZONTAL STEP	mm	50.0	-	Distance between the limit switches on the sensor bar. Allows detecting the shape of the slab.
PG06 : ORTHOGONAL STEP	mm	50.0	-	Space determined by the encoder. Allows detecting the shape of the slab.
PG07 : ENABLE BRIDGE SLAVE	-	OFF	ON - OFF	Enable/Disable slave bridge swing motor. Enable only if a second motor is used for bridge movement
PG08 : LINE MEASURE	mm	1	0 ÷ 999999	Indicates the distance, in measurement units, traveled by the conveyor belt to obtain the encoder pulses set in the <i>pulse</i> parameter.
PG09 : LINE PULSE	-	1	0 ÷ 999999	Indicates the pulses multiplied by 4 provided by the conveyor belt encoder to obtain the space set in the <i>measure</i> parameter. <i>The ratio between measure and pulse is the encoder resolution and must have values between 1 and 0.000935.</i>
PG10: SLAB ENTRY	-	LFT	LFT - RT	Indicates the slab entry position: LFT = slab enters the machine from the left RT = slab enters the machine from the right
PG11 : BRIDGE AUTO-LEARN	-	OFF	0 ÷ 1	Enables the option to automatically learn the minimum and maximum slab height to optimize bridge swing.
PG12 : ENABLE ABRASIVE MANAGEMENT	-	OFF	ON-OFF	Enables the reading of abrasive thickness and head height. Enable only if analog inputs are used for abrasive thickness measurement

<b>Parameter Name</b>	<b>Unit of Measurement</b>	<b>Default</b>	<b>Range</b>	<b>Description</b>
PG14 : HEADS ENABLE/DISABLE	-	TOUCH	TOUCH - SELECTORS	Mode of enabling/disabling heads: TOUCH = enable/disable heads via touchscreen SELECTORS = enable/disable heads via selectors
PG15 : AUTO/MANUAL SELECTOR	-	ON	0 ÷ 1	Enables manual/auto selector.
PG16 : PRESTART TIME	s	3.0	0 ÷ 9999.9	Time between start command and actual machine start (during this time, the warning signal is active). If less than the motor activation time, the greater of the two is applied.
PG17 : LUBRICATION TIME ON	s	0.0	0 ÷ 9999.9	Lubrication ON time.
PG18 : LUBRICATION TIME OFF	s	0.0	0 ÷ 9999.9	Lubrication OFF time.
PG19 : MOTORS TIME ON	s	1.000	0 ÷ 99.999	Pause time between the activation of one motor and the next (in sequential activation).
PG20 : MOTORS TIME OFF	s	0.200	0 ÷ 99.999	Pause time between the deactivation of one motor and the next (in sequential deactivation).
PG21 : BELT EXIT MOTOR TIME	s	0.000	0 ÷ 99.999	Wait time to start sequential motor deactivation, starting when there are no more pieces on the conveyor belt.
PG22 : ABRASIVE THICKNESS WARNING	mm	300	0 ÷ 999999	Minimum abrasive thickness measurement. If the abrasive thickness is less than or equal to the set value, a warning is displayed.
PG23 : ABRASIVE THICKNESS ALARM	mm	200	0 ÷ 999999	Minimum abrasive thickness measurement. If the abrasive thickness is less than or equal to the set value, an alarm is displayed.
PG24 : ABRASIVE ALARM TIMEOUT	ms	0	0 ÷ 999999	Timer for which if the abrasive thickness is below the warning or alarm value for the set time, the respective message appears.
PG25 : HEADS OUTPUT	-	CONST	CONST ÷ PULSE	Operating mode of the heads activation output. CONST = the output remains active for the entire head usage time, PULSE = the output remains active for a set time (PG27).
PG26 : BELT OUTPUT	-	CONST	CONST ÷ PULSE	Operating mode of the conveyor belt activation output. CONST = the output remains active for the entire conveyor belt usage time, PULSE = the output remains active for a set time (PG27).
PG27 : PULSE TIME	s	0.000	0 ÷ 99.999	Activation time of the heads and conveyor belt outputs if they are enabled as pulse outputs.
PG28 : BELT DELAY	s	0.000	0 ÷ 99.999	Delay time for activating the conveyor belt after the bridge starts.
PG29 : MAX SLAB HEIGHT	mm	-	0 ÷ 999.9	Maximum slab height on entry
PG30 : ANTICIPATION SPACE	mm	0.0	-9999.9 ÷ 9999.9	Anticipation space for the brush lowering.
PG31 : DELAY SPACE	mm	0.0	-9999.9 ÷ 9999.9	Delay space for brush lifting.
PG32 : REFERENCE SPEED	m/'	0.0	0 ÷ 9999.9	Reference speed for the use of brush anticipation and delay. If set to 0, no speed proportionality is applied, and the values are used in a constant manner.
PG34 : RAMP TYPE	-	1	0 ÷ 1	Ramp type. Logic level 0 = linear ramp Logic level 1 = S-shaped ramp
PG35 : EDGE-HEAD DISTANCE	mm	-	0 ÷ 99.999	Distance between the edge and the head center
PG36 : BRIDGE-HEAD DISTANCE	mm	-	0 ÷ 99.999	Distance between the bridge homing sensor and the head center
PG37 : SENSOR-HEIGHT DISTANCE	mm	-	0 ÷ 99.999	Distance between the sensor bar and the slab height reading sensor

## 2.4 Belt Setup

### Belt Axis Resolution



Parameter Name	Unit of Measure	Default	Range	Description
MEASURE	mm	0.1	0 to 99999.9	Indicates the space, in units of measurement, traveled by the belt to obtain the encoder pulses set in the <i>pulse</i> parameter.
PULSE	-	1	0 to 999999	Indicates the pulses multiplied by 4 provided by the belt encoder to obtain the space set in the measure parameter. The ratio between measure and pulse is the encoder resolution and must have values between 1 and 0.000935.
+	JOG FORWARD			
-	JOG BACKWARD			

## 2.5 Bridge Setup



= GANTRY ENABLED (master and slave bridge move together)



= GANTRY DISABLED (master and slave bridge move independently)

### BRIDGE SETUP

PB01: TOLERANCE 999999 mm

PB02: ENABLE TIME 99999 s

PB03: DISABLE TIME 99999 s

PB04: MAXPOS MASTER 9999999 mm

PB05: MINPOS MASTER 9999999 mm

PB06: ACCELETATION TIME 99999 s

PB07: DECELERATION TIME 99999 s

PB08: INVERSION TIME 99999 s

PB09: DEACTIVATIO TIME 99999 s

PB10: OUTPUT MODE MOVE

PB11: CHANGE ABR POSIT 9999999 mm

PB12: PRESET POSITION MASTER 9999999 mm

PB13: PRESET POSITION SLAVE 9999999 mm

PB14: PRESET VELOCITY 999%

PB15: PRESET SLOW VELOCITY 999%

PB16: PRESET DIRECTION MASTE FORWARD

PB17: PRESET DIRECTION SLAVE FORWARD

PB18: HOMING MODE GANTRY MOVE

PB19: MAX DISALIGN. 9999999 mm

PB20: MAX HOMING DISALIGN 9999999 mm

PB21: SLAVE HOMING OFFSET 9999999 mm

PB22: MAXPOS SLAVE 9999999 mm

PB23: MINPOS SLAVE 9999999 mm

PB24: HOMING MAX TIME 9999999 s

**RESOLUTION**

**P. I. D. MASTER**

**P. I. D. SLAVE**





**JOG SLAVE**

Parameter Name	Unit of Measure	Default	Range	Description
PB01: TOLERANCE	mm	5.0	0 to 99999.9	Defines a tolerance range around the positioning dimensions. If the positioning falls within this range, it is considered correct.
PB02: ENABLE TIME	s	0.200	0.000 to 9.999	Advance enabling of the bridge movement.
PB03: DISABLE TIME	s	0.200	0.000 to 9.999	Delay in disabling the bridge movement.
PB04: MAX MASTER POSITION	mm	99999.9	-99999.9 to 99999.9	Maximum position reachable by the master bridge.
PB05: MIN MASTER POSITION	mm	-99999.9	-99999.9 to 99999.9	Minimum position reachable by the master bridge.
PB06: ACCELERATION TIME	s	1.00	0.00 to 9.99	Time required to go from speed 0 to maximum speed.
PB07: DECELERATION TIME	s	1.00	0.00 to 9.99	Time required to go from maximum speed to speed 0.
PB08: REVERSAL TIME	s	0.50	0.00 to 9.99	Used to prevent mechanical stress due to too rapid changes in direction of movement.
PB09: DEACTIVATION TIME	s	0	0 to 99999	Rest time of the bridge beyond which the axis enabling output is deactivated.
PB10: OUTPUT MODE	-	STILL	MOVE, STILL	Axis enabling output operation mode. \ MOVE: The output activates before axis movement and deactivates after it has finished, following the timing set in parameters PB04 and PB05. \ STILL: The output activates before movement and deactivates only when the state enters emergency.
PB11: ABRASIVE CHANGE POSITION	mm	0.0	-99999.9 to 99999.9	Bridge positioning when requested to interrupt the cycle for abrasive change.
PB12: MASTER PRESET POSITION	mm	0.0	-99999.9 to 99999.9	Position loaded into the count when the axis activates and then releases the Homing sensor (master).
PB13: SLAVE PRESET POSITION	mm	0.0	-99999.9 to 99999.9	Position loaded into the count when the axis activates and then releases the Homing sensor (slave).

Parameter Name	Unit of Measure	Default	Range	Description
PB14: PRESET SPEED	%	5	1 to 100	Speed for the homing sensor search.
PB15: SLOW PRESET SPEED	%	2	1 to 100	Speed for releasing the homing sensor.
PB16: MASTER PRESET DIRECTION	-	BACKWARD	FORWARD, BACKWARD	Direction in which to search for the homing sensor (master).
PB17: SLAVE PRESET DIRECTION	-	BACKWARD	FORWARD, BACKWARD	Direction in which to search for the homing sensor (slave).
PB18: GANTRY HOMING MODE	-	2	1 to 2	Gantry homing mode only if 2 motors are used for bridge movement (one master and one slave)\ Homing mode 1: positioning will be done by disengaging the slave axis\ Homing mode 2: positioning will be done with master and slave axes always engaged\ Refer to the operator's manual for more information
PB19: MAX MISALIGNMENT	mm	1	0 to 999999.9	Maximum misalignment (mm) between master bridge axis and slave bridge axis before sending an alarm signal.
PB20: MAX HOMING MISALIGNMENT	mm	1	0 to 999999.9	Maximum misalignment (mm) between master bridge axis and slave bridge axis before sending an alarm signal during the homing phase.
PB21: SLAVE HOMING OFFSET	mm	0	-99999.9 to 99999.9	Displacement (mm) that the slave bridge axis must perform after homing.
PB22: MAX SLAVE POSITION	mm	99999.9	-99999.9 to 99999.9	Maximum position reachable by the slave bridge (master).
PB23: MIN SLAVE POSITION	mm	99999.9	-99999.9 to 99999.9	Minimum position reachable by the slave bridge (slave).
PB24: MAX HOMING TIME	s	.	99999	Maximum time for performing homing.


### 2.5.1 Bridge Buttons / Settings

Calibration pages are divided into:

<b>RESOLUTION</b> 	setting the resolution of the master and slave axis
<b>P. I. D. MASTER</b> 	calibration procedure for the master axis to adjust feedback and set offset and maximum speed
<b>P. I. D. SLAVE</b> 	calibration procedure for the slave axis to adjust feedback and set offset and maximum speed \ Enabled only if parameter PG 07 = ON
<b>JOG SLAVE</b> 	manual jog procedure forward/backward for the slave axis \ Enabled only if parameter PG 07 = ON

### Bridge Axis Resolution



Parameter Name	Unit of Measure	Default	Range	Description
MEASURE	mm	0.1	0 to 99999.9	Indicates the space, in units of measurement, traveled by the bridge to obtain the encoder pulses set in the <i>pulse</i> parameter.
PULSE	-	1	0 to 999999	Indicates the pulses multiplied by 4 provided by the bridge encoder to obtain the space set in the measure parameter. The ratio between measure and pulse is the encoder resolution and must have values between 1 and 0.000935.
				
Gantry (master/slave connection) enable/disable button. Usable only if parameter PG 07 = ON				

## Bridge Calibration

**MASTER BRIDGE TUNING**

**CALIBRATION** **OFF**

VOLTAGE OUTPUT 99999999 U

OFFSET 99999999 U

**A** OFF **-** **+**

VELOCITY 99999999 mm/s  
99999999 Hz

MAX VELOCITY 99999999 mm/s

POSITION **= 0** 99999999 mm  
999999999999

SLAVE POSITION 99999999 mm

DISALIGNMENT 99999999 mm

**POSITIONER** **STOP**

DELTA 99999999 mm

SET VELOCITY 99999999 mm/s

ACC. TIME 99999999 s

DEC. TIME 99999999 s

FEEDFORWARD 99999999 %

PROP. GAIN 99999999

INTEGRAL TIME 99999999 s

MAX FOLL. ERROR 99999999 mm

INVERSION TIME 99999999 s

PROP. GAIN SLAVE 99999999

PROP. GAIN JOG M 99999999

PROP. GAIN JOG S 99999999


FOLLOW ERROR 99999999 mm

MAX. ERR. AXIS + 9999999 mm

MAX. ERR. AXIS - 9999999 mm

Navigation: Play, B1 B2, RESET FOLLERR., Stop

Parameter Name	Unit of Measure	Default	Range	Description
OUT VOLTAGE	V	0.0	-10.0 to 10.0	Inverter/Driver control voltage
OFFSET	V	0.0000	-99.9999 to 99.9999	Voltage value to obtain 0 Volts from the analog output
SPEED	mm/'	-	-	Bridge speed
MAX SPEED	mm/'	5000	0 to 9999999	Bridge speed with 10 Volt command
POSITION	mm	-	-	Master bridge position
MASTER POSITION	mm	-	-	Master bridge position
MISALIGNMENT	mm	-	-	Current misalignment between master and slave
DELTA	mm	0.0	-	Bridge pendulum space
SET SPEED	mm/'	0	-	Bridge speed
ACCELERATION TIME	s	0.00	-	Acceleration time
DECELERATION TIME	s	0.00	-	Deceleration time
FEEDFORWARD	%	100.0	0.0 to 200.0	The percentage coefficient that, multiplied by the speed, generates the feed-forward part of the control output.
PROP. GAIN	-	0.000	0.000 to 9.999	The coefficient that, multiplied by the tracking error, generates the proportional part of the control output during automatic master movement.
INTEGRAL TIME	s	0.000	0.000 to 9.999	The time that produces the integral coefficient of tracking error.\ The integration of this error multiplied by this coefficient generates the integral part of the control output.
MAX TRACKING ERROR	mm	99.9	0.0 to 99999.9	Defines the maximum acceptable deviation between the theoretical position and the actual position of the axis, beyond which an alarm is generated.
REVERSAL TIME	s	1.0	1.0	Defines the axis reversal time during calibration.
TRACKING ERROR	mm	-	-	The instantaneous value of the tracking error.
MAX AXIS ERROR +	Not-modifiable. Indicates in mm the maximum tracking error of the axis during positive movement.			
MAX AXIS ERROR -	Not-modifiable. Indicates in mm the maximum tracking error of the axis during negative movement.			

Parameter Name	Unit of Measure	Default	Range	Description
	Gantry (master/slave connection) enable/disable button. Usable only if parameter PG 07 = ON			



## SLAVE BRIDGE TUNING



### CALIBRATION

OFF

VOLTAGE OUTPUT 99999999 V

OFFSET 99999999 V

A

-

+

VELOCITY 99999999 mm/s  
99999999 Hz

MAX VELOCITY 99999999 mm/s

POSITION = 0 99999999 mm  
9999999999

MASTER POSITION 99999999 mm

DISALIGNMENT 99999999 mm

### POSITIONER

STOP

DELTA 99999999 mm

SET VELOCITY 99999999 mm/s

ACC. TIME 99999999 s

DEC. TIME 99999999 s

FEEDFORWARD 99999999 %

PROP. GAIN 99999999

INTEGRAL TIME 99999999 s

MAX FOLL. ERROR 99999999 mm

INVERSION TIME 99999999 s

---

FOLLOW ERROR 99999999 mm

MAX. ERR. AXIS + 99999999 mm

MAX. ERR. AXIS - 99999999 mm






RESET  
FOLL.ERR.



Parameter Name	Unit of Measure	Default	Range	Description
OUT VOLTAGE	V	0.0	-10.0 to 10.0	Inverter/Driver control voltage
OFFSET	V	0.0000	-99.9999 to 99.9999	Voltage value to obtain 0 Volts from the analog output
SPEED	mm/'	-	-	Bridge speed
MAX SPEED	mm/'	5000	0 to 9999999	Bridge speed with 10 Volt command
POSITION	mm	-	-	Master bridge position
SLAVE POSITION	mm	-	-	Slave bridge position
MISALIGNMENT	mm	-	-	Current misalignment between master and slave
DELTA	mm	0.0	-	Bridge pendulum space
SET SPEED	mm/'	0	-	Bridge speed
ACCELERATION TIME	s	0.00	-	Acceleration time
DECELERATION TIME	s	0.00	-	Deceleration time
FEEDFORWARD	%	100.0	0.0 to 200.0	The percentage coefficient that, multiplied by the speed, generates the feed-forward part of the control output.
PROP. GAIN	-	0.000	0.000 to 9.999	The coefficient that, multiplied by the tracking error, generates the proportional part of the control output during automatic master movement.
INTEGRAL TIME	s	0.000	0.000 to 9.999	The time that produces the integral coefficient of tracking error.\ The integration of this error multiplied by this coefficient generates the integral part of the control output.
MAX TRACKING ERROR	mm	99.9	0.0 to 99999.9	Defines the maximum acceptable deviation between the theoretical position and the actual position of the axis, beyond which an alarm is generated.
REVERSAL TIME	s	1.0	1.0	Defines the axis reversal time during calibration.
PROP.GAIN SLAVE	-			The coefficient that, multiplied by the tracking error, generates the proportional part of the control output during automatic slave movement.
PROP.GAIN JOG M	-			The coefficient that, multiplied by the tracking error, generates the proportional part of the control output during master jog movement.

Parameter Name	Unit of Measure	Default	Range	Description
PROP. GAIN JOG S	-			The coefficient that, multiplied by the tracking error, generates the proportional part of the control output during slave jog movement.
TRACKING ERROR	mm	-	-	The instantaneous value of the tracking error.
MAX AXIS ERROR +	Not-modifiable. Indicates in mm the maximum tracking error of the axis during positive movement.			
MAX AXIS ERROR -	Not-modifiable. Indicates in mm the maximum tracking error of the axis during negative movement.			
	Gantry (master/slave connection) enable/disable button. Usable only if parameter PG 07 = ON			

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