Quick-Reference Guide for using the ePG together with other Beamex products

Introduction

This document provides an overview on how to use your MC6 family calibrator to control the ePG Electric Pressure Pump and Controller in your daily work. It also describes what to consider when working with Beamex Calibration Management Software (CMX or LOGiCAL).

Requirements

• MC6 family calibrator (MC6, MC6-WS, MC6-Ex or MC6-T) with firmware version 4.30 or later and "Pressure controller communication, ePG" option installed on the calibrator.



Note: Both can be checked in the calibrator's **Settings > About** window.

• ePG firmware version 2.00 or later.

Enable communication between an MC6 family calibrator and the ePG

MC6 family calibrator does not automatically recognize your ePG. You need to configure the controller communication to pair the devices.



Note: If you have more than one ePG, you can assign each ePG on a separate Controller Presets channel (maximum 4).

- **1.** Connect an MC6 family calibrator to your ePG using a USB Type-A to Type-C communication cable.
- **2.** Power both devices on (ePG will power itself on automatically when the USB cable is connected to the calibrator).
- 3. From MC6 Home View, open Settings > Controller Presets.
- 4. Set the following:
 - **Connection Inferface**: shows the connected ePG's with their serial numbers. Select the one you want to communicate with.
 - Controller Type: Beamex ePG
 - Control Mode: according to your needs (Shut off or Continuous)
 - **Reference Module**: select the pressure module of the MC6 family calibrator that you want to use as a reference (This can be any internal or external pressure module that is available). The ePG will not operate if no reference pressure module is available at all.

Working with an MC6 family calibrator and the ePG

When MC6 family calibrator is used to control the ePG, the reference pressure readings are taken from one of the MC6 family calibrator's internal or external pressure modules.

The selected reference pressure module range sets the available setpoint range for the ePG, however not in a way, that the setpoint range would become larger than normal ePG range. Examples:

- With P6C, the ePG provides the lower setpoint limit (-0.85 bar) and the pressure module provides the upper limit (6 bar)
- With P60, the pressure module limits the lower setpoint limit to 0 bar and the ePG provides the upper limit (20 bar)

The selected reference pressure module will be used in all MC6 operational modes, with one exception: the selected Input Port/Function in Documenting Calibrator in *Controlled* mode will permanently override the setting in Controller Presets.

The selected reference pressure module along with the controller's name are visible on all the buttons and dialogues, where the controller can be selected (see examples below).

1 =	Calibrator	14:4	4 (9:56)	
Pressure	#1: ePG(P1: P20C)	Gauge	▶0◄	
			bar	
ba 	r			
Select Quantity				

Figure 1: Example 1

	Port / Function	X
P1: P20C -1.05 20.8 (g) bar		
P2: P6C -1.05 6.24 (g) bar		
P3: P400mC -414 414 (g) mbar		
PB: PB 0.699 1.201 (a) ba	r	
#1: ePG(P1: P20C) -0.9 20.7 (g) bar		1/2

Figure 2: Example 2

Settings/Controller Presets: Shut off vs. Continuous

Global setting that is not available in Documenting Calibrator. If needed, change settings before calibration.

Shut off

Shut off means that once the setpoint is reached, adjustment stops. The ePG will not try to adjust the pressure even in case of an overshoot. This way the hysteresis will not be lost.

Continuous

Continuous means that adjustment continues even after the setpoint is reached. This is useful for compensating small leaks and temperature expansion over a longer period. When an MC6 family calibrator is controlling the ePG, all the push buttons on the ePG, except for the power button, are disabled. When entering the **Home View**, the control is released and manual operation is possible (alternatively by removing the ePG from the measurement channel by selecting another function, e.g. other quantity or port, etc.).



Note: When the user returns to the **Home View**, the ePG will keep the pressure in the system by closing all the valves.

Venting and Zeroing

The ePG vents when you enter value 0 in Gauge mode. If no other setpoint is given, **Vent** leaves the valves open for 1 minute. This gives the user some time to zero the reference pressure module.



Tip: Zeroing is important – a possible offset in the reference module can confuse the ePG controlling the pressure.

Zeroing is performed as follows:

- enter value 0 in Gauge mode to vent the ePG. The ePG keeps the valves open for 1 minute
- allow the pressure to stabilize
- press the zeroing button on the MC6 display



Note: MC6 does not accept zeroing if there is pressure in the system.

Documenting Calibrator mode

In order for the references to be properly displayed on the calibration certificates, Documenting Calibrator mode settings have to be configured properly. When you create instruments in the MC6 family calibrator and plan to send the results to either CMX or LOGiCAL, create the instrument **Input** by following the example instruction below:



Figure 3: Step 1: Select Quantity for the instrument Input

	Quantity	X	
Pressure	Current	Voltage	
TC Temperature	RTD Temperature	Temperature	[STOP]
Resistance	Frequency	Pulse	
HART	FOUNDATION Fieldbus H1	Profibus PA	
Switch	Keyed		

Figure 4: Step 2: Select Pressure

Port / Function		
P1: P20C -1.05 20.8 (g) bar		
P2: P6C -1.05 6.24 (g) bar		
P3: P400mC -414 414 (g) mbar		
PB: PB 0.699 1.201 (a) bar		
#1: ePG(P1: P20C) -0.9 20.7 (g) bar		1/2

Figure 5: Step 3: Select an INT or EXT pressure module as a Port/Function

m ≡ Input	(no name	
Quantity Pressure	Port / Function P1: P20C	
Unit bar	Pressure Type Gauge	1/11
Automatic Control	ne	

Figure 6: Step 4: Select controller via Automatic Control

1	Automatic Control	X
#1: ePG, Controller		
		STOP

Figure 7: Step 5: Select the ePG

input		(no name)	X
Quantity	Port / Function		
Pressure	P1: P20C		2
Unit	Pressure Type		
bar	Gauge		
			1/11
Automatic Control			
#1: ePG, Controller			
Sets the calibration p	oints (Input Method: Co	ntrolled)	

Figure 8: Step 6: The pressure module selected for Port/Function is the reference. This pressure module will override and change the Reference Pressure selection in the Controller Presets

Calibrating Analog gauges

When calibrating pressure gauges (analog indicators), it can be challenging to interpret the readings between the marks on the pressure gauge. That is why a cardinal point calibration is usually performed. This means that you adjust the

pressure so that the gauge dial $\land \land \land$ is aligned with a cardinal point, which makes it easier for you to interpret the reading. You can do this in the Documenting Calibrator mode as follows:

1 =		(no nam	e)	1	4:54	9:37
→Z Press	sure	bar	☑⇒।	Keyed		bar
	2.4	1966			2.	50
P1: P20C		Cauge				
1 +†			Error:	0.068 (% of	f Span (O	utput))
T						
•			0			
_						
		Accent P	oint	Info	➡ 2.5	000
	5	/ tocopt 1	onn		(2.5	50)

Figure 9: Cardinal point calibration

If you want to fine-tune the setpoint, press the Pause button and change the setpoint via the menu (see figure below).

	e) 14:55 🔜
	∠ → Keyed bar
Functions	2.50
Enter Set Value	
	Error: 0.104 (% of Span (Output))
Instrument Input	
Instrument Output	0
Zeroing	
Reject Calib	oration Info Undo Point

Figure 10: Menu dialog to change the setpoint value

It is possible to go back and forth between the Pause and Play buttons at the same setpoint.

Opening an instrument while the ePG is not connected

If you open an instrument, where controller communication is needed and the controller is not available, the calibrator will prompt you about a missing controller. You are still able to access and edit the instrument and when you connect the pressure controller, calibration can start.



Figure 11: Missing controller notification

Working with the Calibration Management Software

The following chapter describes the ePG settings to be taken into consideration for the Calibration Management Software configuration (CMX or LOGiCAL).

Working with CMX

Requirements

There is no need to upgrade the CMX version in order to start using the ePG. The only requirement is that your MC6 family calibrator is able to communicate with your CMX version.

MC6 family calibrator (with firmware version 4.30 or later)	CMX version from which calibrator communication is supported
MC6	2.7
MC6-WS	2.7
MC6-Ex	2.11.2
MC6-T150	2.12.2
MC6-T660	2.12.1

Table 1: MC6 fami	ly calibrator	and CMX	version	compatilibility
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Configuration

A minor configuration change is needed for the pressure instruments, when you want to use the MC6 to control the ePG to generate the pressure. If you have previously been using hand pumps to generate the input pressure, you have set the Input method in the function window as *Measured*.

Now, when working with the ePG, the Input method needs to be changed to *Controlled*, which means that the external controller (ePG) only generates the setpoints. The pressure generated by the ePG is measured by the MC6 using a separate internal or external pressure module.

Name	Pressure Transmitter		
Abbreviation	pt		
Function Index	1		
Input			
Category	Analog variable	\sim	
Quantity	PRESSURE	\sim	
Range	0 - 10 bar	\sim	
Method	Controlled	\sim	
Pressure Type	Controlled Controlled and Measured		
Output	Measured		
Category	Sourced Annalog variable		
Quantity	ELECTRICAL	\sim	
Range	4 - 20 mA	\sim	
Method	Measured		
Sensor Supply			
Quantity		\sim	
Level		~	
Transfer Function	Linear	\sim	
Repeatability Formula	Standard Deviation of Average Output	\sim	
Initial Calibration Count	Total Calibrations 17		
Note		~	
		\sim	

If you want the calibrator to automatically accept the calibration points, make sure you have the following configurations in the procedure window:

- Acceptance set to automatic
- *Max Deviation* sets a range around the setpoint (in % of span). When the Input is within the set range, the calibration point can be automatically accepted, even though the exact setpoint has not been reached.
- *Calibration Point Delay* defines the time (in seconds) how long the calibrator waits after the Input is stable before the readings are accepted.

Calibration Procedure				
Name	Procedure for Pressure Transmitter			
Active Procedure				
Initial Calibration Date	19.2.2000			
Interval	365	days	\sim	
Due Date	13.2.2023			
Error Calculation Method	% of span 🛛 🗸			
Reject If Error (Constant) >	0,5	% of span		
Reject If Error (Relative) >	0	% of reading		
Error Resolution	0.01 ~			
Advanced Error Limit	Settings			
Adjust If Error >		% of Reject If Error		
Don't Adjust If Error <		% of Reject If Error		
Adjust To Error <		% of Reject If Error		
Error Limits Calculated From	Output		\sim	
Acceptance	Automatic		~	
Calibration Points				
3 Up 🗸 🗸	Output Points	Fixed Points		
Nr. Input Value Resolution [bar]	Max Deviation nstruction [% of span]	on		
1 0,000 0,001	0			
3 10,000 0,001	0			
Calibration Point Delay	5	seconds	~	
Require Stable Output				

If you occasionally need to use a hand pump to calibrate the instrument, it is possible to configure CMX so that the user can change the Input method in the calibrator and perform the calibration. When transferring results from the calibrator to CMX, the user will be notified that the instrument differs, but it is possible to transfer the results without affecting the instrument. This setting can be found in CMX settings/Calibration tab:

COMMUNICATION				
Allow receiving Calibration Results without updating instrument data				
Include Plant Path while communicating with calibrator supporting Plant Path				
Add Database Name as 1st Plant Path level				
3 Calibration interval to be received as one event (days)				
Max 25 characters VMC5 Family Position and Device ID Handling				

Working with LOGiCAL

When you check out the instrument for calibration, set the Input method in the function tab as *Controlled*.

2		(\$)	8
Calibrator family	Template	Function and procedure	User
Checking ou	t instrument		
Instrument	ts / ··· / Press	ure transmitter	
Calibrator: MC	.6		
Configure ch	neckout		
bollingere er			
✓ C	onfiguration done, p	proceed to next st	ep >
✓ c	onfiguration done, p	proceed to next st	ep >
C The selected c pelow. Modify	onfiguration done, p alibrator family and t them to suit your ne	template define the	ep >
C The selected c below. Modify	alibrator family and them to suit your ne	template define the	ep >
C The selected c below. Modify FUNCTION	onfiguration done, p alibrator family and t them to suit your ne PROCEDURE	template define the	ep >
C The selected c below. Modify FUNCTION	onfiguration done, p alibrator family and t them to suit your ne PROCEDURE	template define theeds.	ep > ne initial settings iable
C The selected c below. Modify FUNCTION	onfiguration done, p alibrator family and t them to suit your ne PROCEDURE	template define theeds. Analog var Pressure	ep > ne initial settings iable
C The selected c below. Modify FUNCTION	onfiguration done, p alibrator family and t them to suit your ne PROCEDURE Input category Input quantity Input range	template define theeds. Analog var Pressure 0 1 bar	ep > ne initial settings iable
C The selected c below. Modify FUNCTION	onfiguration done, p alibrator family and t them to suit your ne PROCEDURE Input category Input quantity Input range	Analog var Pressure 0 1 bar	ep > he initial settings iable
C The selected c below. Modify FUNCTION	onfiguration done, p alibrator family and t them to suit your ne PROCEDURE Input category Input quantity Input range Method * Controlled	eroceed to next str template define th eeds. Analog var Pressure 0 1 bar	ep > he initial settings iable
FUNCTION NPUT	onfiguration done, p alibrator family and t them to suit your ne PROCEDURE Input category Input category Input quantity Input range Method * Controlled	Analog var Pressure 0 1 bar	ep > he initial settings iable
FUNCTION	onfiguration done, p alibrator family and t them to suit your ne PROCEDURE Input category Input quantity Input range Method * Controlled Sensor supply*	Analog var Pressure 0 1 bar	ep > he initial settings iable

On the procedure tab, you can configure the following settings to make the calibration points automatically accepted:

- Point acceptance: set to automatic
- *Max Deviation* sets a range around the setpoint (in % of span). When the Input is within the set range, the calibration point can be automatically accepted, even though the exact setpoint has not been reached.
- *Calibration Point Delay* defines the time (in seconds) how long the calibrator waits after the Input is stable before the readings are accepted.

FUNCTION	PROCEDURE		
	Point acceptance *		
	Automatic		• ?
	Calibration point dela	y (s) *	
	5		?
PROCEDUR			
E	Calibration point max	deviation (%)	
	5		?
	Require Sta	ble Output	0
	Output loop supply *		
	ON		• ?

The chosen method can also be changed in the calibrator and the ePG will not be a part of the traceability chain.

Troubleshooting

Table 2: Troubleshooting

I cannot choose ePG from the Controller Presets	Check that the Requirements to communicate with the ePG are fulfilled
I cannot generate 20 bar pressure	Make sure you have selected a reference pressure module that is capable of measuring 20 bar
I don't see the pressure rising in my MC6 family calibrator even though the pump is running	Check your connections. Make sure you are connected to the correct pressure module (the one that is selected as the Reference Module in Controller Presets)
Pressure generation stops in the middle of the calibration, pressure is vented and the ePG switches itself off	This happens when the ePG battery runs out. You need to recharge the ePG battery to continue working
Pressure generation stops in the middle of the calibration but pressure is not vented	Check that your cables are connected. The ePG stops generation if the USB communication cable is removed