

GE Sensing & Inspection Technologies

# Druck DPI 620

# advanced modular calibrator

user manual - K0449





### Ouick reference data

A1.1 DPI 620: Channel 1 (CH1)			
Measure (M) / Source (S) / Power (P)			
±30 V (M)	±55 mA (M)		
0 to 12 V (S)	0 to 24 mA (S)		
±2000 mV (M)	8 RTDs (M/S): Pt1000, Pt500, Pt200, Pt100(385),		
0 to 2000 mV (S)	Pt50, D 100, Ni 100, Ni 120		
0 to 4000 Ω (M/S)	12 Thermocouples (M/S): K, J, T, B, R, S, E, N, L, U, C, D		
0 to 50 kHz (M/S)	1 20 Vrms (M): voltage connectors on CH1 only.		
Switch (M)	1 2000 mV rms (M): voltage connectors on CH1 only.		
	① 300 Vrms, 50 Hz to 400 Hz (M).		
	Only with the AC probe; see Section 3.2.5.		

#### A1.2 DPI 620: Channel 2 (CH2)

±30 V (M)	0 to 24 mA (S)
±2000 mV (M)	24 V loop (P); maximum: 24 mA
±55 mA (M)	Switch (M) 🥵

#### A1.3 DPI 620 + MC 620 + PM 620

Pressure* (M)		
Gauge: 25 mbar to 200 bar Absolute: 350 mbar to 1000	(0.36 to 3000 psi) ) bar (5 to 15000 psi)	
Note: Maximum pneumatic pressure: 500 bar (7250 psi)		

\*Caution: To prevent damage to the PM 620 module, only use it within the specified pressure limit on the label.

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Safety	Before you use the instrument, make sure that you read and understand all the related data. This includes: the applicable local safety procedures, this publication, and the instructions for the accessories/options/equipment you are using it with.		
General warnings	(!) WARNING (!)		
	<ul> <li>It is dangerous to ignore the specified limits for the instrument or its related accessories. Do not use the instrument or accessory if it is not in its normal condition. Use the applicable protection and obey all safety precautions.</li> </ul>		
	• Do not use the instrument in locations with explosive gas, vapour or dust. There is a risk of an explosion.		
Electrical warnings	<ul> <li>To prevent electrical shocks or damage to the instrument, do not connect more than 30V between the terminals, or between the terminals and the ground (earth).</li> </ul>		
	• To prevent electrical shocks, use only the GE specified AC probe (Part: IO620-AC) to measure AC voltages that are more than 20 Vrms (maximum: 300 Vrms). Attach it to the specified connections only.		
	<ul> <li>This instrument uses a Lithium-Polymer (Li-Polymer) battery pack. To prevent an explosion or fire, do not short circuit, do not disassemble, keep it safe from damage. For operating conditions, see Table 10-1.</li> </ul>		
	• To prevent battery leakage or heat generation, only use the battery charger and power supply in the temperature range 0 to 40°C (32 to 104°F). For operating conditions, see Table 10-1.		
	<ul> <li>To make sure the display shows the correct data, disconnect the test leads before you set the power to on or change to another measure or source function.</li> </ul>		
Pressure warnings	If you use a pressure option with the DPI 620 calibrator, these warnings are also applicable:		
	• Some liquid and gas mixtures are dangerous. This includes mixtures that occur because of contamination. Make sure that the equipment is safe to use with the necessary media.		

Continued

- Pressurized gases and fluids are dangerous. Before you attach or disconnect pressure equipment, safely release all the pressure.
- To prevent a dangerous release of pressure, make sure that all the related pipes, hoses and equipment have the correct pressure rating, are safe to use and are correctly attached.
- It is dangerous to attach an external source of pressure to a PV 62x series pressure station. Use only the specified mechanisms to set and control the pressure in the pressure station.

#### Cautions Caution: To prevent damage to the display, do not use sharp objects on the touch-screen.

#### To prevent damage to the PM 620 module, only use it within the specified pressure limit on the label.

Before you start an operation or procedure in this publication, make sure that you have the necessary skills (if necessary, with qualifications from an approved training establishment). Follow good engineering practice at all times.

irks and symbols				
the instrument	CE	Complies with European Union directives		Warning - refer to the manual
	*	Read the manual	•<	USB ports: Type A; Mini Type B connector
	÷	Ground (Earth)	٩	ON/OFF
	1 Wi-Fi	Slot for a micro Secure Digital (SD) WiFi card <sup>*</sup>	2	Slot for a micro-SD memory card
		DC adaptor polarity: the cer	ntre of th	ne plug is negative.
	X	Do not dispose of this produ Chapter 9 (Maintenance pro	ict as ho ocedure	busehold waste. Refer to s).
	More n marks, symbol	narks and symbols are speci display symbols (Chapter 1) s (Chapter 4).	fied in tl ; pressu	nis manual: electrical ure related marks and

The micro WiFi card is not yet available but WiFi functions are available with part number: DPI 620 CE WIFI

#### Marks and symbols on

#### Overview







PM 620



Pressure calibrator

The advanced modular calibrator (AMC) is part of a set of hand-held modules that you can quickly put together to include a wide range of calibrator functions.

Advanced modular calibrator, DPI 620 (this user manual): This is a battery-powered instrument for electrical measure and source operations and HART® communications; see Table A1 (front cover). It also supplies the power and user interface functions for all the add-on modules. You can use the touch-screen to display up to six different parameters.

**Pressure module carrier, MC 620 (this user manual):** This attaches to the DPI 620 calibrator to make a fully integrated pressure indicator instrument. To measure and display pneumatic or hydraulic pressures, you can have up to two interchangeable pressure modules at a time.

**Pressure modules, PM 620 (this user manual):** These modules attach to the pressure module carrier (MC 620) or to a pressure station (PV 62x) to give the DPI 620 calibrator the necessary pressure measurement functionality. They are fully interchangeable "plug and play" modules with no initial set-up or user calibration.

**Pressure stations, PV 62x (user manual - K0457):** There are three pressure stations:

 two pneumatic pressure stations to give you accurate and controlled pressure and vacuum conditions:

PV 621: -950 mbar to 20 bar (-13.5 to 300 psi) version PV 622: -950 mbar to 100 bar (-13.5 to 1500 psi) version

• one hydraulic pressure station to give you accurate and controlled hydraulic pressure conditions:

PV 623: 0 to 1000 bar (15000 psi)

You can attach the DPI 620 calibrator and a PM 620 module to make a fully integrated pressure calibrator instrument.

To give the attached equipment overpressure protection, there are pressure relief valves (PRV) available for all the pressure stations.

**Software (this user manual):** The DPI 620 calibrator includes the following software:

- documenting software
- HART® communications software

Other accessories and options: For part numbers (P/N), refer to Section 1.4 (Accessories).

## Summary of This table gives a summary of the available functions with the DPI 620 calibrator. functions DPI 620 - Calibrator functions Function Easy to read liquid crystal display (LCD) in colour No keys: the touch-screen has large buttons for finger operation. Rechargeable lithium polymer battery with enhanced power control for prolonged battery life. Measure current (mA), voltage (Volts/mV), frequency (Hz/pulse count) \* Supply current (mA), voltage (Volts/mV), frequency (Hz/pulse count) \* Measure/simulate: - a Resistance Temperature Detector (RTD): Ω or °C/°F - a thermocouple (TC): mV or °C/°F - a resistor $(\Omega)$ Cold Junction (CJ) compensation: Automatic/Manual Step/Ramp functions: Automatic/Manual Switch test and condition indicator (open/closed) Language selection (see Section 2.10 (Menu sequence)) Universal Serial Bus (USB) communications ports: For computer communications, external modules, flash memory drives Micro SD memory slot: up to 4 GB of additional memory *†* WiFi model for wireless operation *†* Windows<sup>®</sup> CE operating system \*\* Measure pressure/Leak test: See pressure accessories Documenting software to give an analysis of a device calibration Setup function to save and recall personal settings, instrument calibration settings and other standard instrument operations.

	DPI 620 - Calibrator functions (Continued)				
	Function				
	HART <sup>®</sup> (Highway Addressable Remote Transducer) communications software to set up and calibrate devices that use the HART field communications protocol.				
	Other functions: Hold, maximum/minimum/average, filter, tare, adjustable backlight, adjustable volume for the sound port, alarm indication (on the display and from the sound port), automatic power off.				
<ul> <li>* Refer to the datasheet</li> <li>** Optional item</li> <li>† Factory configured</li> </ul>					
About this manual	<ul> <li>This user manual is set up for you to use on a computer or similar device that has the necessary software to read a Portable Document Format (PDF) file.</li> </ul>				
	It is supplied as a PDF on a compact disc (CD) but you can copy or save the PDF onto a computer or similar device that has the necessary PDF software.				
	To navigate between related items of information, the user manual includes cross references and links (shown in blue); for example:				
	<ul> <li>text cross references: Figure 1-1; Table 10-1; Chapter 1; Section 1.4 (Accessories)</li> </ul>				
	<b>Note:</b> If you move the PDF software cursor over an item that has a link, the cursor symbol normally changes.				
	When you click on a link, your PDF software shows the applicable page. To help you navigate through the links you use, your PDF software usually includes these buttons:				
Example buttons:	<i>Previous view</i> : To go back to a previous page selection.				
۲	<i>Next view</i> : In a sequence of page selections, this takes you forward to the next page.				
	<b>Note:</b> Different software versions have different buttons. In some versions, it is also necessary to set up the "View" to include these "Tools" in the "Page Navigation Toolbar"; refer to				

your PDF software documentation.

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# Chapter 1: Instrument parts, accessories and options

**1.1 Introduction** This chapter gives a description of the different parts of the instrument and the accessories/options available.

display comes on.

see Figure 1-3.

1.

2.

3.

#### 1.2 The instrument



4. Colour display with touch-screen. The number of windows you see on the display is set by the number of task selections and external modules you are working with (maximum: 6); see Section 2.9 (Display operation). To make a selection, lightly tap on the applicable display area with a finger.
5. Sealed speaker unit.

On or off button. Press and hold the button down until the

Rubber pull-down cover for the USB type A connector; USB mini type B connector and +5V DC power input socket;

Channel 1 (CH1) and channel 2 (CH2) connectors for

electrical operations; see Figure 1-2.

Figure 1-1: General view of the instrument

V CH1 MA+ CH2 V MA+	2a	Channel 1 (CH1) connectors for:
		V: volts/mV DC or AC*; Hz: frequency and counts/min, counts/hour (cpm/cph); Ω: resistance; RTD: 2-wire, 3-wire (3W), 4-wire (4W) resistance temperature detectors; 
Figure 1-2: CH1/CH2	2b	Channel 1 (CH1) connectors for thermocouples ( <b>TC</b> ). Refer to Chapter 3.
CONTECTIONS	2c	Isolated channel 2 (CH2) connectors for:
		V: volts/mV DC; <b>mA+, mA-:</b> current; <b>24Vo:</b> 24V loop power supply; <b>**</b> : switch operation; refer to Chapter 3. For HART connections, refer to Chapter 8.
(COM = Common)	Note: witho 20Vrr	* You can measure an AC voltage (maximum: 20 Vrms) ut the GE specified AC probe (P/N IO620-AC). If it is more than ns, you must use the AC probe (maximum: 300 Vrms) in CH1

connectors V/Hz and COM; see Section 3.2.5.



Figure 1-3: The USB and power sockets



Figure 1-4: Bottom view (cover attached)

3a	• C→ : USB type A connector for connections to external peripherals (USB flash memory or optional external modules).
3b	• CHARTER Section 2.4 (Power options).
3c	

6.	Cover for the USB connectors and the DC power input socket (Figure 1-3). For IP65, press it fully into the recess over the connectors.
7.	Two connection points to attach the pressure module carrier (MC 620); refer to Chapter 4 (Pressure indicator operation (MC 620)).
8.	Electrical connections for the pressure module carrier (MC 620) or a pressure station (PV 62x).
9.	Label: <i>model</i> , <i>date of manufacture</i> (DoM: month/year), <i>serial number</i> (S/N); <i>manufacturer</i> . name, address, website
10.	Compartment cover for the battery and the optional Secure Digital cards.



Figure 1-5: Bottom view (cover/battery removed)

11.	Two position guides for the battery. Refer to Section 2.5.2 (Install the battery).	
12.	Slot for a micro Secure Digital WiFi card *.	
13.	Slot for a micro Secure Digital memory card (maximum: 4GB).	
14.	Electrical connections for the battery.	

\* The micro WiFi card is not yet available but WiFi functions are available with part number: DPI 620 CE WIFI

### 1.3 The display

This is a LCD with a colour display and a touch-screen. To make a selection, lightly tap on the applicable display area with a finger; see Section 2.9 (Display operation).



### 1.4 Accessories



1.	IO620-PSU. DC power supply
2.	IO620-BATTERY. Li-Polymer battery
3.	209-539. Set of six electrical test leads
4.	K0454. Safety and quick reference guide
5.	UD-0002. CD with the user manual

6.	IO620-AC. AC probe that attaches to the specified calibrator sockets (see Section 3.2.5) and measures up to 300 VAC.
7.	IO620-CASE-1. Fabric carry case with a belt loop, shoulder strap and a large pocket for accessories. It can hold one DPI 620 calibrator.
8.	IO620-CASE-2. Fabric carry case. It can hold a set of units: one DPI 620 calibrator; one MC 620 module carrier; PM 620 modules and related accessories.
9.	IO620-BATTERY. Spare or replacement Li-Polymer battery.
10.	IO620-CHARGER. External battery charger to charge a battery when it is not in the instrument.
11.	IO620-PSU. Spare DC power supply
12.	IO620-USB-PC. USB mini Type B cable to connect the DPI 620 calibrator to a computer.
13.	IO620-IDOS-USB. Adaptor to connect the DPI 620 to a IDOS universal pressure module.
14.	IO620-USB-RS232. Adaptor to connect the DPI 620 to a RS232 interface.
15.	IO620-FIELD-CAL. Intecal field calibration manager. Use the documenting functions in the calibrator with elements of your Intecal database; set up new device records and procedures; upload Intecal data to your computer database.

Figure 1-7: Accessories included

16.	Pressure modules (PM 620); refer to the datasheet.
17.	Pneumatic hose kit rated to 400 bar (5800 psi) with "Quick fit" connectors for the test port.
	IO620-HOSE-P1: 1 metre (≈ 39")
	IO620-HOSE-P2: 2 metre (≈ 78")
18.	Hydraulic hose kit rated to 1000 bar (15000 psi) with "Quick fit" connectors for the test port.
	IO620-HOSE-H1: 1 metre (≈ 39")
	IO620-HOSE-H2: 2 metre (≈ 78")
19.	Pressure adaptor sets designed for the MC 620, PV 62x and the hose kits:
	IO620-BSP: G1/8, G1/4 male; G1/4, G3/8 and G½ female
	IO620-NPT: 1/8NPT, ¼NPT male, ¼NPT, 3/8NPT, and ½NPT female
	IO620-MET: M14 x 1.5 and M20 x 1.5 female

# **Chapter 2: Prepare the instrument**

2.1 Introduction	This chapter gives a description of these items:
	<ul> <li>the initial checks and procedures</li> </ul>
	the available power options
	<ul> <li>the battery and related procedures (install and charge)</li> </ul>
	the start up procedures
	<ul> <li>the menu structure and options</li> </ul>
	<ul> <li>the Process and Automation options available for the measure and source (</li></ul>
2.2 Initial checks	Before you use the instrument for the first time:
	<ul> <li>Make sure that there is no damage to the instrument, and that there are no missing items; see Figure 1-7.</li> </ul>
	<ul> <li>Remove the plastic film that protects the display. Use the tag</li> <li>() in the top right-hand corner.</li> </ul>
2.3 Initial procedures	Before you use the instrument for the first time, complete these procedures:
	• Install the battery (Section 2.5.2). Then re-attach the cover.
	• To make sure that the calibration schedule works correctly, set the date and time; see Section 2.10 (Menu sequence).
	Charge the battery (Section 2.5.3)
2.4 Power options	There are three power options:
	Lithium-Polymer battery (Section 2.5): All the instrument functions are available with a charged battery.
	<b>5 V DC power supply (Section 2.6):</b> All the instrument functions are available with or without the battery. It supplies power to the instrument and charges the battery at the same time. It charges the battery when the instrument is on or off.
	<b>USB mini Type B connection (Section 2.7):</b> This charges the battery when the instrument is off and increases the battery life when the instrument is on.

2.5 The battery		( ) WARNING ( )	
		<ul> <li>This instrument uses a Lithium-Polymer (Li-Polymer) battery pack. To prevent an explosion or fire, do not short circuit, do not disassemble, keep it safe from damage. For operating conditions, see Table 10-1.</li> </ul>	
		<ul> <li>To prevent an explosion or fire, use only the GE specified battery, power supply and battery charger.</li> </ul>	
		• To prevent battery leakage or heat generation, only use the battery charger and power supply in the temperature range 0 to 40°C (32 to 104°F). For operating conditions, see Table 10-1.	
		For a full battery specification, refer to Table 10-1.	
2.5.1	Battery condition	When you first get your DPI 620 calibrator, the battery has approximately 60% of full charge. You can use the battery immediately but, for maximum operating time, we recommend you give it a full charge (Section 2.5.3).	
	Charge indications	When you set the power on, the battery symbol at the top of the display shows the charge condition in 10% increments.	
		To get an accurate indication (1% increments), use the <i>Configuration</i> menu; see Section 2.10.2 (Procedure to see the instrument status).	

### 2.5.2 Install the battery



Step	Procedure
1.	When the power is off, loosen the five screws (a) and remove the cover (b).
X	If necessary, turn the instrument over and let the discharged battery drop into your hand.
	If the battery does not hold a charge, discard it safely. Obey all the local health and safety procedures.
2.	Install the new battery correctly until it is flat in the compartment.
3.	Re-attach the cover.

# **2.5.3** Charge the battery You can charge the battery in the instrument (Section 2.6) or you can use the optional external battery charger; see Section 1.4 (Accessories).

#### 2.5.4 Charge times

Charge method	Charge time (to full capacity)
DC power supply	$\approx$ 6.5 hours
External battery charger	≈ 6.5 hours
USB mini Type B connector	≈ 13 hours (with a 500 mA supply)

**Note:** You can use the instrument while the DC charger is charging the battery but this increases the charge time.

#### 2.5.5 Operating time

	Operation	Battery duration
	Continuous operation (measure)	> 10 hours
	Continuous operation (measure and source with loop power on)	> 6 hours
	These are typical operating time Li-polymer battery pack with the	s for a new, fully charged se settings:
	• Backlight Intensity set to 80%	(Default: 80%)
	• Backlight Timeout set to 2 ho	urs (Default: 2 minutes)
Power save options	To get the best battery duration, Backlight Intensity (40%) and a s Section 2.10.1 (Procedure to set	set a low value for the short <i>Timeout</i> , see the basic operations:)
2.6 The DC power	(1) WARN	IING 🗥
supply	<ul> <li>To prevent an explosion or specified battery, power support of the second secon</li></ul>	fire, use only the GE oply and battery charger.
	• To prevent battery leakage of the battery charger and pow temperature range 0 to 40°C conditions, see Table 10-1.	or heat generation, only use ver supply in the c (32 to 104°F). For operating

If there is a battery, internal safety circuits control the charge cycle. If you are using the instrument, this increases the time to charge the battery.



Step	Procedure
1.	Attach the applicable socket adaptor to the DC power supply.
2.	On the right-hand side of the instrument (Figure 1-3), use the rubber recess to pull down the cover for the connections.
3.	Push the power supply connector into the 5 V DC input socket and set the power on.

# 2.7 The USB power supply

You can use the optional mini Type B cable to supply power to the instrument.

This charges the battery when the instrument is off and increases the battery life when the instrument is on.



Step	Procedure
1.	Start the computer.
2.	Push the Type A end of the USB cable into a USB socket on your computer.
3.	On the right-hand side of the instrument (Figure 1-3), use the rubber recess to pull down the cover for the connections.
4.	Push the mini Type B end of the USB cable into the USB socket on the instrument.

2.8 Power on or off



To set the instrument power on, press and hold this button down until the display comes on ( $\approx$  2 seconds). During the power on sequence, the instrument shows a timer and then shows the applicable data.

To set the instrument power off, press and release this button again. When the power is off, the last set of configuration options stays in memory.

#### 2.9 Display operation



This instrument has a touch-screen. To make a selection, lightly tap on the applicable display area (window, button, option) with a finger.

*Caution: To prevent damage to the display, do not use sharp objects on the touch-screen.* 

The number of windows you see on the display is set by the number of task selections and external modules you are working with (maximum: 6); see Section 2.10.3 (Procedures to make Task selections).

#### 2.9.1 Change items in a list

A ((@)) Select	((@))	C ((©)) Select Utility
Volt	ıe ∖/	Max/Min/Avg
None	6	None
Curren		Max/Min/Avg
Voltage	œ	Switch Test
Millivolts		
тс	<b>*</b>	
TC mV		
Frequency		
×	~	× 🗸

To change an item in a list, you have these options:

- tap on the item you want to use (A)
- tap on the ▲ or ▼ button
- tap on one of the horizontal bars beside the list C (if applicable)

Accept: To accept the selection and go back to the previous display, tap this button. If necessary, tap this button on all subsequent displays until you get back to the start.

*Cancel*: To cancel the selection and go back to the previous display, tap this button

#### 2.9.2 Change numeric values

	Date	E	nter Set	
<mark>1</mark> 2/08/08				5.!
7	8	9	7	8
4	5	6	4	5
1	2	3	1	2
0			0	+/-
×	+		×	+

There are numeric keypad displays for these items:

- dates and times
- setpoint values
- source Automation processes (Nudge, Span Check, ... )
- · calibration and other processes

Tap in the necessary value on the keypad. If applicable, the keypad includes the buttons for +/- and decimal point.

*Backspace*: To go back one character, tap this button. If it is not a date or time, it deletes the character.



oint

9

6

3

*Accept*: To accept the specified value and go back to the previous display, tap this button.



*Cancel*: To cancel the specified value and go back to the previous display, tap this button.

#### 2.9.3 Enter text

Re	Log c45	<sup>file</sup> 6789	0 (((	0	)))∎(((	2		•	
A	в	С	D		file				
E	F	G	Н	5	6789	0	1		
	J	к	L	1	с	d	Ĺ		
м	Ν	0	Р	1	g	h	9	file 6789	0
Q	R	S	Т	1	k	1	F	2	3
U	V	w	X	1	0	р	-	6	7
Υ	Z	L,	Del	h	s	t	h	0	
((@	)))	u	v		w	x	h	\$	. %
1		у	z			Del	h	*	(
						,			?
					1	@			Del

There are alphanumeric keypad displays for these items:

- Captions; see Section 2.10.4 (maximum: 15 characters; all characters permitted)
- Filenames (maximum: 10 characters; no special characters)
- 1. Tap in the applicable characters.
- **2.** To accept the data and go back to the previous display, tap on the completed text in the data entry box.

.... *Next keypad*: To use characters on the next keypad (upper case > lower case > numeric), tap this button.

Del Delete: To delete the last character in the data entry box, tap this button.

*Escape*: If there are no characters in the data entry box, the *Esc* button replaces the *Del* button. To leave the keypad and go back to the previous display, tap on the *Esc* button.

#### 2.9.4 Maximise/minimise a window

You can have up to 6 functions on the display. To set a *Process* (measure operations), an *Automation* option (source operations), or other *Settings* you must maximise the applicable function:





Automation (source operations ()



#### 2.10 Menu sequence



\* A channel can only have one function at a time.

#### 2.10.1 Procedure to set the basic operations:

Configuration	Description
Configuration E Settings 3 ((⊚)) ?? Status E <sup>*</sup> Data Logging	Auto Powerdown Sets the power off automatically after the specified <i>Timeout</i> period. To save the battery power, set this to <i>On</i> .
Courter Screen	Status: On or Off Timeout: 00:02:00 to 01:00:00 hours:minutes:seconds (hh:mm:ss)
((())) 1	Sets the backlight. Low values save battery power; see Section 2.5.5 (Operating time).
Settings	<i>Timeout:</i> 00:02:00 to 02:00:00 hours:minutes:seconds (hh:mm:ss) <i>Intensity</i> : 20, 40, 60, 80, 100%
(((©))) → (((©)) → A ((©)) → A (((©)) → A (((©)) → A (((©)) → A ((((((((((((((((((((((((((((((((((((	Clock Sets the date and time. The calibration function uses this to give calibration messages.
<ul> <li>Q. Audio (((⊚)) → E</li> <li>((⊚)) → (</li> </ul>	<i>Time</i> : 24 hour; hours:minutes:seconds (hh:mm:ss)
	Language Sets the language. ﷺ Selected D English
	Selected: English (Other languages to be released).
	Sets the volume of the tones and alarms.
	Volume: Mute, Low, Medium, High.

#### 2.10.2 Procedure to see the instrument status



#### 2.10.3 Procedures to make Task selections





**Note:** \* Observed (Only available as a source option). Use this option to make a manual record of the readings on another instrument; see Section 2.11.3

When you first use the calibrator, there are default measure  $\mathcal{C}$  and source  $\mathcal{C}$  functions on the display:

- CH1 settings: RTD source, RTD type is PT100, scale is °C; Automation is *Nudge*; see Chapter 3.
- CH2 settings: Current measure, see Chapter 3.

*Procedure Overview* Use the *Task* menu to complete these procedures:

- Set the calibrator functions you want to use on the display: item (A); see Section 2.10.4.
  - a. CH1: Channel 1 electrical function: You can choose one option:

None		Resistance	<b>()</b>
Current	<b>()</b>	RTD	<b>()</b>
Voltage	<b>()</b>	CJ	<b>C</b>
Millivolts	<b>()</b>	AC Volts	<b>C</b>
TC (°C/°F)	<b>()</b>	AC mV	<b>C</b>
TC (mV)	<b>()</b>	AC Probe	<b>C</b>
Frequency	<b>()</b>	Observed*	<b>⊘</b> →

b. CH2: Channel 2 electrical function: You can choose one option:

None			Voltage	<b>C</b>	
Current	<b>C</b>	Ø	Millivolts	C^	
Current (24V)	<b>C</b>	Ø	Observed*		0+

- c. \* Pressure function (P1): for the PV 62x pressure stations, refer to user manual - K0457; for the MC 620 module carrier, see Chapter 4.
- d. \* Pressure function (P2): the MC 620 module carrier can use P1 and/or P2; see Chapter 4.
- e. \* IDOS function: Universal pressure module; see Chapter 3.
- f. HART function: HART device communications; see Chapter 8
- If applicable, change the *Units* for the function: item **B**; see Section 2.10.5



#### 2.10.4 Set a function

If applicable, set a Utility for the function: item C

- a. Max/Min/Avg; see Section 2.10.6
- Switch Test: CH1, P1, P2 and IDOS functions use the CH2 switch connections; CH2 functions use the CH1 switch connections. See Chapter 3
- c. Leak Test (Pressure options only); see Chapter 4

**Note:** If you make the connections for a switch on CH1 or CH2, you cannot set another function on that channel.

This example shows the sequence to set the Channel 1 (CH1) function. It is a similar procedure for other functions.



#### 2.10.5 Set the units

If a function has alternative units, you can set another unit. If there are no alternatives, the area is shown grey.



#### 2.10.6 Set up a utility: 📈 Maximum/Minimum/Average example

This example shows the sequence to set the *Max/Min/Avg* utility. You can use the same procedure for these options:

- Switch Test; see Chapter 3
- Leak Test (pressure options only); see Chapter 4



# 2.11 Measure and source operations





C Settings Process (()) C Leak Test (()) C Leak Test (()) C Zero (()) C () C Leak Test (()) C



When you have set the measure and source functions that you want to see on the display (see Section 2.10.3), you can complete these procedures:

 If necessary, change the *Process* for the CH1 and/or CH2 measure functions: item

This includes: *Tare*, *Alarm*, *Filter*, *Flow*, *Scaling*; see Section 2.11.1

There are more optional *Settings* for the *TC*, *Frequency*, and *RTD* functions; see Chapter 3.

 If necessary, change the Automation options for the CH1 and/or CH2 source functions: item

This includes: *Nudge*, *Span Check*, *Percent Step*, *Defined Step*, *Ramp*; see Section 2.11.2

There are more optional *Source Settings* for the *TC*, *Frequency*, *and RTD* functions; see Chapter 3.

There are other *Settings* for *Observed* functions; see Section 2.11.3

- If necessary, change the Settings for the pressure function: item C
  - a. *Process* (*Tare, Alarm, Filter, Flow, Scaling*); see Section 2.11.1
  - b. *Leak Test* (Only when the function is set up with this *Utility* Section 2.10.6); for operation, see Chapter 4.
  - c. Zero; see Chapter 4
- If necessary, change the Configuration: item D

This includes: *Data Logging* (Chapter 6), *Documenting* (Chapter 7), and *Advanced* options (Section 2.12).

• When all the software selections are complete, make the applicable connections (electrical and/or pressure).

Examples:

- a. Electrical and IDOS operations (Chapter 3);
- b. Pressure operations with the MC 620 module carrier (Chapter 4)

c. Pressure operations with a PV 62x pressure station (refer to the user manual - K0457)

#### 2.11.1 Set the Process options (measure 👩 )

*Note:* Section 2.9 (*Display operation*) shows how to set and change the values on the display.

*Tare* Use *Tare* to set a temporary value for zero. This makes an adjustment to all subsequent readings on the display.





	🗾 Scaling:			
Current Current 0000 20.0000 55.0000	Tare       Tare       Off	Image: Scaling 3       Image: Scaling 3         Image: Scaling 0       Image: Scaling 0         Image: Scaling 0	Set On or Off Measured Value 1 0.0000 mA Displayed Value 1 0.0000 % Set a label name	Set a scale for Point 1 and Point 2
CH Current Coursent 67 36.3636 100.0000 %	<u>,</u>	Previous:	Back one display	

#### 2.11.2 Set the Automation options (source > )

**Note:** Section 2.9 (Display operation) shows how to set and change the values on the display.

🔷 Nudge	
1≝ Automation ∳Process Nudge	Description
CHI → 0.000 24.000 1.00 Ω	Process: Nudge; Values to set: Step Size
	Use these buttons to increase or decrease the output value. Increments = Step size.
1 TAP	Use this button (Setpoint) to set the output value.
🔀 Span Check	
*8 Automation	Description
CHI - 0.00 Δ 4000.00	Process: Span Check; Values to set: Low, High, Dwell
4000.00 Ω 4000.00 Ω Φ Dwell 00:00:10	Use these buttons to change the value manually from <i>High</i> to <i>Low</i> .
1 TAP 🏠 🦛	Use the start and stop buttons to change the value automatically from <i>High</i> to <i>Low</i> .

*Dwell* sets the period between each change. The cycle repeats automatically.

<b></b> % P	ercent Step
	al Automotion

	Process Percent Step
3 Aug 09:22 CH1	kLow 0.00 Ω
O.00 4000.00 Ω	High 4000.00 Ω
	☐ Step Si: 10.00 %
	Dwell 00:00:10
1	⊷ Auto Repeat Off
TAP	🍖 🛛 🕳

#### Description

Process: Percent Step;

Values to set: Low, High, Step Size (%FS), Dwell, Auto Repeat (On/Off)



Use these buttons to change the value manually by the specified *Step Size*.



Use the start and stop buttons to change the value automatically by the specified *Step Size*.

Dwell sets the period between each change.



	Process Defined Step
3 Aug 09:22	<mark>kmi</mark> Low 0.00 Ω
⊘→ 0.00 4000.00 Ω	High 4000.00 Ω
	Step Size 1.00 Ω
	Dwell 00:00:10
1	Auto Repeat
TAP	🏠 🖌

Description		
Process: Defined Step;		
Values to set: Low, High, Step Size, Dwell, Auto Repeat (On/Off)		
Use these buttons to change the value manually by the specified <i>Step Size</i> .		
Use the start and stop buttons to change the value automatically by the specified <i>Step Size</i> .		

Dwell sets the period between each change.

# 🔼 Ramp



Des	crij	otio	DI

#### Process: Ramp;

Values to set: Low, High, Travel, Dwell, Auto Repeat (On/Off)



Use the start and stop buttons for this process. *Travel* sets the duration of the *Ramp*.

Dwell sets the period between each change in direction.

#### 2.11.3 Set the Observed settings (source $\nearrow$ )

The *Observed* function is available as a *Source* on five of the task selections: CH1, CH2, P1, P2, and IDOS. To set the *Observed* function, see <u>Section 2.10.4</u>.

You can use the Observed function to make a manual record of the readings you can see on another instrument. For example, you can make a permanent record of the readings with Data Logging (Chapter 6).

#### Settings These settings are available:

Description

Values to set:

Units (enter a name for the units)

other instrument.



Resolution (Set one of the 7 options: 1.0 to 0.000001) Use this button (Setpoint) to set the values you see on the

### 2.12 The Advanced menu options

The Advanced menu lets you set or use these options:

- HART resistor
  - Standards

- Calibration
- Setup Files

	*** Advanced         **** HART Resistor         **** HART Resistor         **** Standards         **** Calibration         **** Setup Files         *****	<ul> <li>Set On or Off; see Chapter 8</li> <li>Set the applicable temperature scale for all temperature operations; see Chapter 3 Options: IPTS 68 or ITS 90.</li> <li>See Section 2.12.1</li> <li>See Section 2.12.2</li> </ul>
TAP		

#### 2.12.1 Advanced: Calibration options

There are two calibration menus you can use:

Menu to calibrate the DPI 620 E Calibration operations: Perform Calibration (()) Change Cal PIN ((@)) 1 DPI 620 calibrator. Enter PIN h Set Next Due Date (((())) 2 ((@))= TAP

- 1. Enter the calibration PIN: 4321
- 2. Tap the "Accept" button. You can then continue with these
- Calibrate the different measure and source channels on the

Contact us at: www.gesensinginspection.com

Change the calibration PIN. You must confirm the new PIN.

• Set the next calibration date and/or set the *Notification* option. If *Notification* is *On* and your calibration is overdue, you get a "Calibration due ..." message at the end of the power on sequence.

#### Menu to upgrade the DPI 620 software and firmware

To use most up to date software and firmware on your DPI 620 calibrator, visit our website:

www.gesensinginspection.com

Follow the website instructions to download the files onto a USB flash memory drive. You can then use this menu to upgrade your calibrator.

- 1. Enter the calibration PIN: 5487
- **2.** Tap the "Accept" button. You can then continue with one of these operations:
- Upgrade the software. To complete this operation, put the USB flash memory drive in the USB type A connector (Figure 1-3) and follow the on-screen instructions.
- Upgrade the sensor firmware (PM 620). To complete this operation, put the USB flash memory drive in the USB type A connector (Figure 1-3) and follow the on-screen instructions.
- Upgrade the HART Firmware. To complete this operation, put the USB flash memory drive in the USB type A connector (Figure 1-3) and follow the on-screen instructions.

**Note:** If you make a mistake and there are no files to upload, follow the on-screen instructions and complete the procedure.

When an upgrade completes normally, the initial operation of the touch screen is slower (a period of approximately 30 seconds).

To make sure the upgrade completed correctly, use the *Status* menu (Configuration > Status > Software Build); see Section 2.10.2.


#### 2.12.2 Advanced Setup options

📰 Setup Files	
Save	((@))
Recall	<mark>((@))</mark>
📑 Erase One File	<mark>((@))</mark>
Remory Status	((@))
	<b>«</b>

Use this menu to save and recall personal settings, instrument calibration settings and other standard instrument operations.

**Save:** When you have set up the functions you want to see on the display (Section 2.10.3) and all the measure and source operations (Section 2.11), save your settings to a file.

**Recall:** When you want to use the specified settings again, select the applicable filename from the list.

**Erase One File:** This deletes one file from the list. You must confirm that you want to delete the file.

**Memory Status:** The amount of memory available (in MB and as a % of the total on the device): internal memory; USB memory; micro SD card

#### 2.13 The Help menu



The Help menu includes electrical connection diagrams to help you set up and use the electrical functions on channel 1 (CH1), Channel 2 (CH2).

# Chapter 3: Electrical and IDOS operations

3.1 Introduction	This section gives examples of how to connect and use the instrument for these operations:
	<ul> <li>to measure and source electrical values</li> </ul>
	<ul> <li>to measure the pressure with an IDOS module</li> </ul>
	Before you start:
	<ul> <li>Read and understand the "Safety" section.</li> </ul>
	Do not use a damaged instrument.
	Note: Use only original parts supplied by the manufacturer.
3.2 Measure and source operations	When you first use the calibrator, there are default measure <i>e</i> and source <i>to functions on the display; see</i> Section 2.10.3.
J.Z.I FIOCEGUIE OVELVIEW	
CH1 (((()))	• Set the calibrator functions you want to use on the display: item (A); see Section 2.10.3. This includes:
СН2 ((@))	a. CH1: Channel 1 electrical function (measure or source)
<u>?</u> [] [] [] [] [] [] [] [] [] [] [] [] []	b. CH2: Channel 2 electrical function (measure or source)
2 ·š (@))	c. Pressure function (P1 and/or P2): for the MC 620 module
	carrier, see Chapter 4; for the PV 62x pressure stations (P1 only), refer to user manual - K0457
	d. IDOS function: to measure pressure with an IDOS universal pressure module (UPM), see Section 3.3
	e. other functions (maximum: 6 functions)
((©)) None Units B ((@))	<ul> <li>If necessary, change the Units for the function: item B; see Section 2.10.5</li> </ul>
	<ul> <li>If necessary, set a Utility for the function: item C ; see Section 2.10.6</li> </ul>
Caption	a. Max/Min/Avg
× 🗸	b. Switch Test
	c. Leak Test (pressure options only)





 If necessary, change the *Process* for the CH1 and/or CH2 measure functions: item

This includes: *Tare*, *Alarm*, *Filter*, *Flow*, *Scaling*; see Section 2.11.1.

There are more optional *Settings* for the *TC*, *Frequency*, and *RTD* functions.

 If necessary, change the Automation options for the CH1 and/or CH2 source functions: item

This includes: *Nudge*, *Span Check*, *Percent Step*, *Defined Step*, *Ramp*; see Section 2.11.2

There are more optional *Source Settings* for the *TC*, *Frequency*, *and RTD* functions.

There are other *Settings* for *Observed* functions; see Section 2.11.3.

 When all the software selections are complete, make the applicable electrical connections.

#### 3.2.2 Example procedure: Measure or source current

These examples (A and B) show Channel 1 (CH1) set up to measure or source a current with external loop power.

**Note:** If you use the Channel 2 (CH2) connectors, you can use Channel 2 to measure or source these ranges with internal or external loop power (internal loop power = 24 V).



- 1. Set the applicable software options; see Section 3.2.1 (Procedure overview).
- **2.** Complete the electrical connections and continue with the measure or source operation.
- **3.** Source only (*Automation*): Set the applicable output value; see Section 2.11.2.

#### 3.2.3 Example procedure: Measure DC voltage

These examples (A and B) show Channel 1 (CH1) set up to measure a DC voltage.

**Note:** If you use the Channel 2 (CH2) connectors, you can use Channel 2 (CH2) to measure these ranges.



- 1. Set the applicable software options; see Section 3.2.1 (Procedure overview).
- **2.** Complete the electrical connections and continue with the measure operation.

#### 3.2.4 Example procedure: Measure AC voltage (CH1), 0 to 20 Vrms only

#### 

To prevent electrical shocks, use only the GE specified AC probe (Part: IO620-AC) to measure AC voltages that are more than 20 Vrms (maximum: 300 Vrms). Attach it to the specified connections only. See Section 3.2.5.

These examples (A and B) show Channel 1 (CH1) set up to measure an AC voltage (0 to 20Vrms only).



- Set the applicable software options; see Section 3.2.1 (Procedure overview).
- **2.** Complete the electrical connections and continue with the measure operation.
- 3.2.5 Example procedure: Measure AC voltage (CH1) with the AC probe

#### 

To prevent electrical shocks, use only the GE specified AC probe (Part: IO620-AC) to measure AC voltages that are more than 20 Vrms (maximum: 300 Vrms). Attach it to the specified connections only.

This example shows Channel 1 (CH1) set up to measure an AC voltage with the AC probe (maximum: 300 Vrms).



- 1. Set the applicable software options for the AC Probe; see Section 3.2.1 (Procedure overview).
- **2.** Complete the electrical connections.

Red: V/Hz connector; Black: COM connector

Then continue with the measure operation.

#### 3.2.6 Example procedure: Source DC voltage (CH1)

A

B

These examples (A and B) show Channel 1 (CH1) set up to source a DC voltage.



- 1. Set the applicable software options; see Section 3.2.1 (Procedure overview).
- 2. Complete the electrical connections.
- 3. To continue, set the applicable output value; see Section 2.11.2.

#### 3.2.7 Example procedure: Measure or source current with internal 24V loop power

These examples (A and B) show Channel 2 (CH2) set up to measure or source a current with internal loop power (24 V).



- 1. Set the applicable software options; see Section 3.2.1 (Procedure overview).
- 2. Complete the electrical connections and continue with the measure or source operation.
- 3. Source only (Automation): Set the applicable output value; see Section 2.11.2.

#### 3.2.8 Example procedure: Measure or source frequency signals

These examples (A and B) show Channel 1 (CH1) set up to measure or source a frequency. This includes Hz, kHz and counts (cpm or cph).

The selection of units sets the available range, for example:

Hz = 0 to 1000 Hz kHz = 0 to 50 kHz



Example A	1. Set the applicable software options; see Section 3.2.1
	(Procedure overview).

- **2.** Complete the electrical connections.
- **3.** If necessary change the *Trigger Level* (Settings) and continue with the measure operation.

Values to set.

Mode (Automatic/Manual); Manual Level (trigger level value)

*Example B* **1.** Set the applicable software options; see Section 3.2.1 (Procedure overview).

A

Measure frequency on channel 1 (CH1)

channel 1 (CH1) Range: 0 to 50 kHz Waveform: Triangle Amplitude: 12.0 V Automation: Nudge

(Section 2.11.2)

A234 Trigger Level	
🧱 Mode	
	Manual
Manual Level	
	2.5 V

- 2. Complete the electrical connections.
- 3. If necessary change the Source Settings and continue with source operation.

Values to set.

Waveform (Square, Triangle, Sine); Amplitude (Amplitude value)

4. Automation: Set the applicable output value; see Section 2.11.2.

#### 3.2.9 Example procedure: Measure or simulate an RTD (or Resistance)

These examples (A and B) show Channel 1 (CH1) set up to measure or simulate an RTD. A 4-Wire configuration gives the best accuracy; a 2-Wire configuration has the lowest accuracy (4-Wire RTD shown).

**Note:** To measure or simulate resistance  $(\Omega)$ , set the Resistance function



#### Example A

- 1. Set the applicable software options; see Section 3.2.1 (Procedure overview).
  - 2. Complete the electrical connections.

🚦 Settings	
* Process	
📲 RTD Type	

3. If necessary change the Settings and continue with the measure operation.

B channel 1 (CH1) Range: 850 °C

E Source Settings Automation

**↓**^Waveform

Automation: Nudge

Values to set.

RTD Type (Set the applicable RTD); see Table A1 (front cover) for the available options.

- **Example B 1.** Set the applicable software options; see Section 3.2.1 (Procedure overview).
  - 2. Complete the electrical connections.

📲 Source Settings
******Automation
State RTD Type

**3.** If necessary change the *Source Settings* and continue with source operation.

Values to set.

RTD Type (Set the applicable RTD); see Table A1 (front cover) for the available options.

**4.** *Automation*: Set the applicable output value; see Section 2.11.2.

#### 3.2.10 Example procedure: Measure or simulate a thermocouple (or TC mV)

These examples (A and B) show Channel 1 (CH1) set up to measure or simulate a thermocouple temperature.

**Note:** To measure or simulate TC millivolts, set the TC mV function



- Example A 1. Set the applicable software options; see Section 3.2.1 (Procedure overview).
  - 2. Complete the electrical connections.

	2. If proceeding the Cotting and continue with the
Settings *ØProcess	<b>3.</b> If necessary change the <i>Settings</i> and continue with the measure operation.
<b>А́№ ТС</b> Туре	Values to set.
CJ Compensation	TC Type (Set the applicable TC)
	CJ compensation (Mode: Automatic/Manual). <i>Automatic</i> uses the internal cold junction. Use <i>Manual</i> mode when you want to use an external cold junction.
	CJ Value. For <i>Manual</i> mode, set an applicable value. The value is not used in <i>Automatic</i> mode.
Example E	<ol> <li>Set the applicable software options; see Section 3.2.1 (Procedure overview).</li> </ol>
	2. Complete the electrical connections.
●厦 Source Settings ************************************	<b>3.</b> If necessary change the <i>Source Settings</i> and continue with source operation.
<b>∩≋</b> атс туре	Values to set.
CJ Compensation	TC Type (Set the applicable TC)
	CJ compensation (Mode: Automatic/Manual). <i>Automatic</i> uses the internal cold junction. Use <i>Manual</i> mode when you want to use an external cold junction.
	CJ Value. For <i>Manual</i> mode, set an applicable value. The value is not used in <i>Automatic</i> mode.
	<b>4.</b> <i>Automation</i> : Set the applicable output value; see Section 2.11.2.
3.2.11 Example procedure	: Switch test
	CH1, P1, P2 and IDOS functions use the CH2 switch connections; CH2 functions use the CH1 switch connections.
Switch operation	If you set the Switch Test utility on one channel, the software automatically sets up the other channel for the switch connections.
	<b>Note:</b> If there is a measure or source function on the switch connection channel, it is automatically disabled; you get a screen message " Function Disabled".
	If you try to set a measure or source function on the switch connection channel, you get a message " Function not set".
Example	This example shows a thermocouple switch:



# 3.3 Measure pressure: IDOS option



*Optional item.* An IDOS Universal Pressure Module (UPM) uses Intelligent Digital Output Sensor (IDOS) technology to measure the applied pressure and supply the data to an IDOS instrument.

Before you use an IDOS module, read the user manual: K0378, Druck IDOS UPM.

*Note:* To attach an IDOS module to the DPI 620 calibrator, you must have an adaptor: IO620-IDOS-USB.

#### 3.3.1 Assembly instructions



### 3.3.2 IDOS function procedures

 Task Settings

 CHI

 CHI

When the assembly is complete (Section 3.3.1), you can use these procedures to measure the pressure with the IDOS function:

- Set the calibrator functions you want to use on the display; see Section 2.10.3. This includes:
  - a. IDOS function (to measure the pressure): item (A);
  - b. other functions (maximum: 6 functions); see Section 3.2

- If necessary, change the Units for the function: item B; see Section 2.10.5
  - If necessary, set a *Utility* for the function: item **(**; see Section 2.10.6
    - a. Max/Min/Avg
    - b. Switch Test





- c. *Leak Test.* The procedure is the same for an IDOS module or for a MC 620/PM 620 assembly; see Section 4.4.2.
- If necessary, change the *Settings* for the IDOS function: item **D**
- a. *Process* (*Tare, Alarm, Filter, Flow, Scaling*); see Section 2.11.1
- b. *Leak Test (Only when the Utility is set).* The procedure is the same for an IDOS module or for a MC 620/PM 620 assembly; see Section 4.4.2
- c. *Zero.* The procedure is the same for an IDOS module or for a PM 620 module; see Section 4.4.3. We recommend that you zero a gauge sensor before you use it.
- Continue with the pressure operation.

#### 3.3.3 Example procedure: Measure pressure with an IDOS module



- 1. Assemble the DPI 620 calibrator and the IDOS module; see Section 3.3.1.
- 2. To attach the external pressure equipment, refer to the user manual for the Druck IDOS UPM K0378.
- **3.** Set the applicable software options; see Section 3.3.2 (IDOS function procedures). This example shows the calibrator set up with the IDOS function only.

#### **3.4 Error indications** If the display shows <<<< (under range) or >>>> (over range):

- Make sure that the range is correct.
- Make sure that all the related equipment and connections are serviceable.
- <<<< Under range: The display shows this symbol for this condition: Reading < Negative FS - (10% of negative FS)
- >>>> Over range: The display shows this symbol for this condition: Reading > Positive FS + (10% of positive FS)

### Chapter 4: Pressure indicator operation (MC 620)

#### 4.1 Introduction



This section gives examples of how to connect and use the instrument to measure pressure with the module carrier (MC 620) and the applicable pressure modules (PM 620).

To measure pressure with the IDOS UPM, refer to Chapter 3.

To make a fully integrated pressure calibrator instrument with one of the three pressure stations, refer to the user manual for the PV 62x series of pressure stations - K0457

Before you start:

- Read and understand the "Safety" section.
- Do not use a damaged instrument.

Note: Use only original parts supplied by the manufacturer.

# 4.2 Parts and assembly

This figure shows the parts of the module carrier (MC 620) and pressure module (PM 620).



1.	Pressure connection (G1/8 or 1/8NPT) to attach external pressure equipment.
2.	Pressure and electrical connections for a pressure module (PM 620). These are self-sealing pressure connections.
3.	Two screws to attach the calibrator (DPI 620).
4.	Electrical connections for the calibrator (DPI 620).
5.	Pressure module (PM 620) with a pressure connection, reference port (a) and a label. The label includes:
	<i>Pressure range</i> . Example: 20 bar g (g: gauge; a: absolute); <i>serial number</i> (S/N); <i>manufacturer</i> . name, address, website

*Caution: To prevent damage to the PM 620 module, only use it within the specified pressure limit on the label.* 

When you attach these items to the DPI 620 calibrator, you have a fully integrated pressure indicator that can measure pneumatic or hydraulic pressure.

#### 4.2.1 Assembly instructions



u u	
A new Annual	ŀ
Contract Debugs And Contraction	ŀ
0.000	
24.000 mit	
0.4598	
11	

	Step	Procedure
	1.	Align the two slots (a) on the calibrator with the two posts (b) on the module carrier.
١	2.	When the posts are fully engaged in the slots, tighten the two screws until they are hand tight.
	3.	Attach one or two PM 620 modules with the correct range and type.
	4.	Tighten each one until it is hand tight only.
	ΘP	When this symbol flashes at the top of the display, it shows there is communication between the module and the calibrator.

## 4.3 Pressure connections

#### WARNING: Pressurized gases and fluids are dangerous. Before you attach or disconnect pressure equipment, safely release all the pressure.

The pressure ports for external equipment use "Quick fit" pressure adaptors; see Section 1.4 (Accessories). These are easy to remove, change and install.

#### 4.3.1 Procedure (to attach external equipment)



Step	Procedure
1.	Remove the adaptor from the pressure port.
2.	Use an applicable seal for the pressure connection: <b>a.</b> NPT type: Use an applicable sealant on the thread.
	<ul> <li><b>b.</b> BSP (parallel) type: We recommend a bonded seal at the bottom.</li> </ul>
	<b>c.</b> BSP (parallel) type, 100 bar (1500 psi) or less: a bonded seal at the top is permitted.
3.	Attach the adaptor to the external equipment; if necessary use one of the alternative adaptors in Section 1.4 (Accessories), then tighten to the applicable torque.
L	Continued



Step	Procedure
4.	Re-attach the adaptor to the MC 620 carrier and tighten it until it is hand tight only.

#### 4.4 Measure pressure

#### 4.4.1 Procedure overview

sk Settings CH1 CH2 m۷ Pressure 00 00 ((@)) ((@)) X ((@)) TAP

Settings 3 =((@)) Function æ ((@)) Pressure Units B ((@)) mbar Utility ((@)) None (C) Caption Pressure



When the pressure indicator assembly is complete (Section 4.2.1), use the menus to set up the necessary operations.

To use the pressure indicator, complete these procedures:

- Set the calibrator functions you want to use on the display; see Section 2.10.3. This includes:
  - a. Pressure function (P1 and/or P2): item (A);
  - b. CH1: Channel 1 electrical function (measure or source)
  - c. CH2: Channel 2 electrical function (measure or source)
  - d. other functions (maximum: 6 functions)
- If necessary, change the Units for the function: item (B); see Section 2.10.5
- If necessary, set a Utility for the function: item C ; see Section 2.10.6
  - a. Max/Min/Avg
  - b. Switch Test
  - c. Leak Test; see Section 4.4.2
- If necessary, change the *Settings* for the pressure function: item D
  - a. Process (Tare, Alarm, Filter, Flow, Scaling); see Section 2.11.1
  - b. Leak Test (Only when the Utility is set); see Section 4.4.2
  - c. Zero. We recommend that you zero a gauge sensor before you use it; see Section 4.4.3



• When all the software selections are complete, make the applicable pressure and electrical connections. Examples:

Measure pressure (Section 4.4.4)

#### 4.4.2 📃 Set up a Leak Test

- 1) Set the Utility Set the Utility to Leak Test (Section 2.10.6).
- 2) Set the Leak Test When you have set the Utility to Leak Test, you can set these options options:

Wait Time: The time before the test starts in hours:minutes:seconds (hh:mm:ss)

**Test Time:** The period of the leak test in hours:minutes:seconds (hh:mm:ss)

**Note:** To set the Leak Test options, you must have a pressure module correctly installed (Section 4.2.1).



Steps 5 and 6: Set the Test Time + Set the Wait Time (if necessary)

Go back to the Home window. Start the test when the pressure system is set up.



#### 4.4.3 Set the pressure module to zero

Use this option to write a new zero pressure value to the pressure module you are using.

The sensor adjustment is permitted if it obeys this condition:

Adjustment  $\leq$  10% FS positive pressure value (for the Sensor)

**Note:** To make a temporary adjustment for zero, you can use the Tare function; see Section 2.11.1



4.4.4 Example procedure: Measure pressure



**1.** Assemble the pressure indicator with the correct PM 620 modules; see Section 4.2.1.

	<ol> <li>Set the applicable software options; see Section 4.4.1 (Procedure overview). This example shows two pressur functions:</li> </ol>			
	<ul> <li>Pressure functions P1 and P2 are set up.</li> </ul>			
	<b>3.</b> To attach the external equipment, see Section 4.3.1.			
4.5 Error indications	If the display shows <<<< (under range) or >>>> (over range):			
	<ul> <li>Make sure that the range is correct.</li> </ul>			
	<ul> <li>Make sure that all the related equipment and connections are serviceable.</li> </ul>			
<<<<<	Under range: The display shows this symbol for this condition:			
	Reading < Negative FS - (10% of negative FS)			
>>>>>	Over range: The display shows this symbol for this condition:			
	Reading > Positive FS + (10% of positive FS)			

# Chapter 5: Instrument communications

5.1 Introduction This chapter gives a description of these items:
the procedures to connect the instrument to a computer with the optional USB mini Type B cable

For a full list of optional accessories, refer to Section 1.4.

**5.2 Connect to a computer (USB)** You can use the USB mini Type B connector to connect the instrument to a computer. To download or upload data to the micro SD card or USB flash memory device, see Chapter 6 (Datalog operation).

**Note:** If the power supply fails, the data will not transmit correctly. To prevent loss of data, use the DC power supply (Section 2.6).



Step	Procedure
1.	Start the computer.
2.	Push the Type A end of the USB cable into a USB socket on your computer.
3.	On the right-hand side of the instrument (Figure 1-3), use the rubber recess to pull down the cover for the connections.
4.	Attach the DC power supply (Section 2.6).
5.	Push the mini Type B end of the USB cable into the USB socket on the instrument.
6.	Set the instrument power on.

When the connections are complete you can move files between the computer and the DPI 620 calibrator with your normal file manager software (for example, Windows Explorer).

If you install a USB flash memory device and a micro SD card, the computer can only see the micro SD card. It ignores the USB memory device.

*Note:* The computer cannot get access to the internal memory of the DPI 620 calibrator.

### **Chapter 6: Datalog operation**

#### 6.1 Introduction



This section gives examples of how to log measurements with time and date over a set time period or on a key press. Logged data is stored in a user defined file. The instrument logs all the tasks currently enabled.

Stores this data internally but can be downloaded (transferred) to:

- USB stick
- Wireless (to be released later)
- USB serial port

To enter data logging select configuration menu and press data logging.

#### 6.2 Set-up

Setup
Filename
Filename
Periodic
O0:00:05
Start

To set the data logging process:

Selection	Action
Filename	Enter name using three-page screen alpha/numeric key pad.
Trigger	Set to <b>Key Press</b> to activate on pressing of bottom right key or <b>Periodic</b> set to activate on time set in period
Period	Sets the time period of data recording using numeric keys and HH:MM:SS format.
Start	Starts data logging.

After data logging the data file can be used in the data logging menu as follows:

#### 📭 Log Playback

Filename

🔣File Details

📑 Start

Transfer

📑 📴 Usb Stick

TeUSB Serial Port

Frase

Erase One File

Clear Internal

Clear USB Stick

Clear SD Card



EInternal 69.4% (14.1Mb) Available Usb Stick 92.2% (56.4Mb) Available

SD Card



Filename recalls data by filename from the list.

File details shows file name, start time and number of points.

**Start** begins playback of the selected file by pressing the Pause/Play key.

Press and hold the Pause/Play key for at least two seconds to reverse sequence.

#### Transfer

Recall

The stored data held in the internal memory can be transferred to an external memory device:

USB stick

Wireless (to be released later)

USB serial port

#### Erase

Erase one file Select file to erase

Clear internal erases all files held in the instrument's memory

**Clear USB stick** erases all data on the USB stick detected at the USB port

Clear SD card erases all data on the installed SD card

#### Memory status

The amount of memory available (in MB and as a % of the total on the device):

Internal

USB stick

SD card

6.3 Data Logging	To data log:					
	To log measurements made by the instrument, set the required tasks in Task Settings.					
	Select Configuration and select Data Logging.					
	Select Filename and enter a name using the three-page screen alpha/numeric key-pad.					
	Select Trigger and either a time (Periodic) or key press (play/pause).					
	Select start to set the data logging.					
	The display changes to the task screen with data logging flashing at the top.					
	If necessary, press play/pause to increment the data logging.					
	At the end of data logging press the cancel key.					
	e instrument stores the recorded data.					
6.4 Data handling	Using the data logging menu, a data file can be replayed, stored in a memory device or transferred to an external device; see Section 6.2.					
	The data file can be imported into a number of spreadsheet programs for analysis and graphic presentation.					
	Comma separation applies to this data.					
Comma separated file	Data imported into a spreadsheet					
FILENAME, P080821A COLUMNS,3,9 START,21 Aug 2008, 21:38:59 CHANNEL 001, Current (24V), In,mÅ,55 CHANNEL 005, HART, In,,0 DATA,START ID,Date,Time,Main Reading,Secondary Re: 0,21 Aug 2008, 21:39:14,8.7525,24V,4,0 1,21 Aug 2008, 21:39:29,8.5711,24V,4,0 2,21 Aug 2008, 21:39:59,8.2475,24V,4,0 3,21 Aug 2008, 21:39:59,8.2475,24V,4,0 5,21 Aug 2008, 21:40:29,7.9288,24V,4,0 5,21 Aug 2008, 21:40:29,7.9288,24V,4,0	A         B         C         D         E         F         G         H           1         FILENAME         P080821A         9         9         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1					
	14					

### **Chapter 7: Documenting functions**

#### 7.1 Introduction



This section gives examples of the documenting functions available with the DPI 620 calibrator. There are two options:

**Analysis (Section 7.2):** This function lets you compare the data from two Channels on the DPI 620 calibrator: the device under test (DUT) and a reference instrument.

It calculates the % span or % reading error for the device and then gives a pass or fail indication.

**Run Procedure (Section 7.3):** This uses the Intecal Calibration software (Optional item) to download a calibration procedure.

Before you start:

- Read and understand the "Safety" section.
- Do not use a damaged instrument.

Note: Use only original parts supplied by the manufacturer.

#### 7.2 Analysis

To use the *Analysis* function, set the functions for the two Channels you want to compare (Section 2.10.4). Then use these procedures:



Input and Reference Channel type (A) : Input or Reference

options

**Scaling** (Input only): Values for Reference High and Low and Input High and Low. This sets the scale for the Analysis function.

Error Type (C) (Input only): % Span or % Rdg (Reading)

Linearity (Input only): Linear or Square Root

**Tolerance** (Input only): an applicable value for the pass/fail calculation

When the *Input* and *Reference* options are set, start the analysis.



7.3 Run a procedure

The Intecal calibration *Procedure* contains all the values to calibrate a device under test (test points, ramp time). You can use the same calibration procedure for all the applicable devices under test.

To use the Run Procedure function, you need these items:

• a copy of the Intecal Calibration Software. This is available from our website at: www.gesensinginspection.com

There is a 30 day free trial.

- IO620-USB-RS232 (Intecal version 5 only). An adaptor to connect the DPI 620 calibrator to the RS232 interface on your computer.
- a DPI 620 calibrator device driver: available as a download from our website.

### 7.3.1 Sequence to upload and download file

	Step	Procedure			
	1.	P/N IO620-USB-RS232. Connect the USB Type A connector to the DPI 620 calibrator; see Chapter 5.			
	2.	Connect the RS232 to the serial communications port on the computer that has Intecal installed; see Chapter 5.			
Configuration   Settings   ?? Status   ** Data Logging   #* Touch Screen   Documenting   Documenting   ** Advanced   ** Advanced	3.	Use Intecal to set up the <i>Procedure</i> and create a <i>Work Order</i> for the <i>Device</i> .			
		The procedure includes the parameters for the calibration, the number of test points, the relationship (for example: linear) pass/fail tolerance.			
	4.	Use the <i>Download</i> button in Intecal to download the file to the DPI 620 calibrator. During this process, there is a communications symbol at the bottom of the display.			
	5.	Tap the Run Procedure option			
	6.	In the <i>Results</i> window that opens, select the <i>Filename</i> you specified in Intecal.			
	7.	Enter your User ID and the DUT Serial Number.			
	8.	Tap on the Start button. The Procedure sets up the necessary Channel options (for example: mA and Volts).			
	9.	Use the <i>Take Reading</i> button at each point specified by the procedure. You see a prompt for each point.			
	10.	When all the readings are complete, tap on the <i>Exit</i> button. You can then look at the results on the display ( <i>As Found</i> / <i>As Left</i> ).			
	11.	To complete the process, use Intecal to <i>Upload</i> the file back into the Intecal database.			

### Chapter 8: HART<sup>®</sup> device operations

8.1 Introduction	You can use the DPI 620 calibrator to communicate with devices that use the HART protocol:				
	<ul> <li>The Universal and Common Practice commands specified in HART revision 5 to 7.</li> </ul>				
	This section includes procedures to use the HART functions available in the calibrator.				
	Before you start:				
	<ul> <li>Read and understand the "Safety" section.</li> </ul>				
	<ul> <li>Do not use a damaged instrument.</li> </ul>				
	<b>Note:</b> Use only original parts supplied by the manufacturer.				
8.2 About HART	The HART (Highway Addressable Remote Transducer) protocol uses a digital signal on top of a standard 4 - 20 mA current loop to get data to and from a HART enabled field device. These operations are typical:				
	<ul> <li>read the primary variable and the analogue output</li> </ul>				
	<ul> <li>read the device serial number, type and supplier</li> </ul>				
	<ul> <li>get calibration data (upper and lower range values, sensor limits, calibration date)</li> </ul>				
	<ul> <li>do status and fault finding checks</li> </ul>				
	<ul> <li>change the device configuration (range, units, damping)</li> </ul>				
	One HART device (a master device) starts and controls the communications with commands. The field device (a slave device) uses each command to make a change and/or send data back.				
	Two master devices are permitted: a primary master (usually the main control and monitor system), and a secondary master (usually a handheld communicator). The DPI 620 calibrator operates as a secondary master.				

# 8.3 Available HART commands

This is a list of the commands that are available with the DPI 620 calibrator:

**Note:** HART revision 5 field devices do not support some of these commands.

Command name	Command number	Menu	Type and revision level
Return device ID, hardware/firmware version, HART ID, Number of preambles, manufacturer/model	#0	Hart hardware info	Universal - 5
Primary Variable (PV) and units	#1	PV display screen	Universal - 5
Read loop current	#2	PV display screen	Universal - 5
Tagged poll version of #0 (Command 0)	#11	Tagged poll mode	Universal - 5
Read Tag descriptor and date	#13	Hart hardware info	Universal - 5
Read primary variable transducer serial number, upper lower transducer limits, minimum span	#14	Hart Sensor Info	Universal - 5
Primary damping value, write protect mode, alarm	#15	Hart Sensor Info	Universal - 5
Write Tag descriptor and date	#18	Hart hardware info	Universal - 5
Write primary damping factor	#34	Hart Sensor Info	Common - 5
Write primary variable range values – LRV & URV	#35	Re-range menu	Common - 5
Set primary URV "Span"	#36	Re-range menu	Common - 5
Set primary LRV "Zero"	#37	Re-range menu	Common - 5
Reset configuration changed counter	#38	Calibrate menu	Common - 5
Enter/Exit fixed current mode - loopback test	#40	Trim Menu	Universal - 5
Perform self test	#41	Calibrate menu	Common - 5
Perform device reset	#42	Calibrate menu	Common - 5
Set primary variable zero "Tare"	#43	Re-range menu	Common - 5
Write primary variable units	#44	Advanced device menu	Common - 5
Trim loop current zero	#45	Trim Menu	Common - 5
Trim loop current gain	#46	Trim Menu	Common - 5

Command name	Command number	Menu	Type and revision level
Get extended status info	#48	Hart settings menu	Common - 5
Write primary variable transducer serial number	#49	Hart Sensor Info	Common - 5
Read dynamic variable assignments.	#50	Advanced device menu	Common - 5
Write dynamic variable assignments	#51	Advanced device menu	Common - 5
Read max update time period	#54	Re-range menu	Common - 6
Set poll address	#6	Hart settings menu	Universal - 5
Read analogue channel additional damping factor, range values, alarm code & transfer function	#63	Advanced analogue menu	Common - 5
Write analogue channel additional damping factor	#64	Advanced analogue menu	Common - 5
Write analogue channel range values	#65	Advanced analogue menu	Common - 5
Enter/Exit fixed analogue output mode	#66	Loop test	Common - 5
Trim analogue channel zero	#67	Trim Menu - multiple output device	Common - 5
Trim analogue channel gain	#68	Trim Menu - multiple output device	Common - 5
Write analogue channel transfer function	#69	Analogue channel info	Common - 5
Get poll address	#7	Hart settings menu	Universal - 6
Read analogue channel endpoint values	#70	Advanced analogue menu	Common - 5
Lock device for exclusive access	#71	Device location menu	Common - 6
Squawk	#72	Device location menu	Common - 6
Find device	#73	Device location menu	Common - 6
Read lock device state	#76	Device location menu	Common - 6

Command name	Command number	Menu	Type and revision level
Get measurand classification	#8	Advanced device menu	Universal - 6
Read device variable trim points	#80	Trim Menu	Common - 6
Read device variable trim guidelines	#81	Trim Menu	Common - 6
Write device variable trim point	#82	Trim Menu	Common - 6
Reset device variable trim	#83	Trim Menu	Common - 6
Read burst mode configuration	#105	Hart settings menu	Common - 6
Write burst mode configuration	#109	Hart settings menu	Common - 5

#### 8.4 HART Connections

Before you set up the electrical connections between the HART device and the DPI 620 calibrator, examine the power supply connections for the device you want to work with.

#### 8.4.1 Power supply from the calibrator

In this example, the DPI 620 calibrator supplies the loop power and a 250  $\Omega$  HART resistor.



1. Set the functions for channel 2 and HART:


244

-0.0006

#### 2. Set the HART Resistor in the Advanced menu: Home display Configuration Set to "On" e E Settings Section 2.9 21 Aug 20:36 CH2 Current (24V) ?? Status 🕾 HART Resistor Advanced œ. HART Resistor

((@)) **=** d

Current (PEV)	Touch Screen				
=((@))=		- @ Calibration		HART <sup>®</sup> Disconnected	
transmitted	Documenting			C.	
	***	Setup Files	F		
	Advanced		-		-
		- 🔥 🖉			

3. Complete the electrical connections and continue with the HART menu operation; see Section 8.5.

Off

#### 8.4.2 External loop power

Data Logging

2

((@)) TAP

6

In this example, there is an external power supply.

Status



#### 1. Set the functions for channel 2 and HART:



250 r <b></b> h	2. Set the HART	Resistor in the Advand	ced menu:
Configuration Settings  ?? Status  Data Logging  Touch Screen Documenting  Advanced	Advanced	Set to On Section 2.9	CHOME display CH2 Current CH2 Current -0.00006 55.0000 mA HART Disconnected CH2 Lize Lize Lize Lize Lize Lize Lize Lize

**3.** Complete the electrical connections and continue with the HART menu operation; see Section 8.5.

#### 8.4.3 Communicator attached to a network

In this example, the calibrator connects directly to a network. There must be a  $250\Omega$  resistor in series with the loop power supply and the HART device.



1. Set the function for HART:





**3.** Complete the electrical connections and continue with the HART menu operation; see Section 8.5.

# 8.5 Start HART menu operations

When the power supply connections are complete, you can do a search for the applicable HART device and start the communications process. You use the same sequence of steps for all the power supply options:



#### 8.5.1 HART menu - Information (Sensor, Hardware, Settings)

HART Menu		
HARTS Search		
Information     (((()))     HART Information		HARTA LLADT Company
	,	12345 Serial Number 01924973
Loop Test	P((())) B B B B B B B B B B B B B B B B B	HARTO Transducer Limits
	HaR™ Ø⇒ Manufacturer/Model	0.000 : 20.000 bar
	HART Settings	Minimum Span 0.200 bar
	HARTE Poll Address	
	Not Supported	0.5
	e Hatis Preambles 02/01	
P Clone	Burst Mode/Command	
	HARTS Write Protect Mode	
See	Not write protected PRESSURE	
Section 8.5.2	HART Alarm Mode 01924973	
	<sup>H≴87</sup> •Status Information (()) ■ Status Information	
	HART≉Comms Status	
	<sup>⊭</sup> å₿ <sup>™</sup> Device Status	
	<sup>H&amp;BT®</sup> Command 48 Info	

Hart Menu Bearch					
Calibrate				See	1
	D	'≝ HART Settings	((⊚))⇒ C	0001011 0.0.	1
	Dynamic assignment Not Supported	HAdvanced Analogue	((@)) <b>=</b> E		+ Advanced Analogue
	HAPTe Classification Pressure	<sup>୨୭</sup> ୍ଲ Clone	((@))		CH 2 12395 Channel number 0
	Write PV units kPa		-F		∰ Analogue Channel Info
Re-range	NARTE Re-range		<sup>™</sup> wPaste		Write Additional Damping
					Write range values Not Supported
					Read endpoint values Not Supported
Zero PV					
HaRTe ⊕dUpdate time period Not Supported					

### 8.5.2 HART menu - Information (Advanced, Clone)

#### Example procedure: Clone

The *Clone* function lets you copy the parameters from one field device to another of the same type and range.

- **1.** Attach the first device with the necessary parameters and start communications (Section 8.5).
- 2. Go to the *Clone* menu option and tap on *Copy*. It copies these parameters:
- Tag

• Damping value

PV unit

- Transfer function
- LRV (lower range value)
- URV (upper range value)
- **3.** Go back to the Home display and attach the other field device.
- 4. Start communications with the new device (Section 8.5).
- 5. Go to the Clone menu option and tap on Paste.

To complete the *Clone* operation from one device to another, make sure the DPI 620 calibrator stays on for the whole procedure.



Example procedure: Loop test



The loop current is set to 4.000 mA but the actual loop current is 4.0123 mA. To trim the error, make a note of the actual reading (4.0123) and enter this value in *Analogue Trim Zero* (Step 8).

## Chapter 9: Maintenance procedures

9.1 Introduction		This section gives procedures to maintain the unit in a good condition. Return the instrument to the manufacturer or an approved service agent for all repairs.		
		Do not dispose of this product as household waste. Use an approved organisation that collects and/or recycles waste electrical and electronic equipment.		
		For more information, contact one of these:		
		<ul> <li>our customer service department: (Contact us at www.gesensinginspection.com)</li> </ul>		
		<ul> <li>your local government office.</li> </ul>		
9.2 Clea	n the unit	Clean the case with a moist, lint-free cloth and a weak detergent. Do not use solvents or abrasive materials.		
9.3 Replace the batteries		To replace the batteries, refer to Section 2.5. Then re-attach the cover.		
	-	All the configuration options stay in memory.		

## **Chapter 10: General specification**

**10.1 Introduction** For a full specification of the DPI 620 calibrator and its related accessories (MC 620 carrier, PM 620 module, and PV 62x pressure stations) refer to the datasheet supplied on the CD (CD: P/N UD-0002).

Display	LCD: Colour display with touch-screen
Operating temperature	-10 to 50°C (14 to 122°F)
Storage temperature	-20 to 70°C (-4 to 158°F)
Ingress Protection	IP65 (DPI 620 calibrator only)
Humidity	0 to 90% relative humidity (RH) non-condensing
Shock/Vibration	Def Stan 66-31, 8.4 cat III
EMC	Electromagnetic compatibility: BS EN 61326-1:2006
Electrical safety	Electrical - BS EN 61010:2001
Pressure safety	Pressure Equipment Directive - Class: Sound Engineering Practice (SEP)
Approved	CE Marked
Battery power	Lithium-Polymer battery (GE Part number: 191-356)
	Capacity: 5040 mAh (minimum), 5280 mAh (typical); Nominal voltage: 3.7 V.
	Charge temperature: 0 to 40°C (32 to 104°F)
	When the instrument senses the temperature is outside this range, it stops charging.
	Discharge temperature: -10 to 50°C (14 to 122°F).
	Charge/discharge cycles: > 500 > 70% capacity

Table 10-1: General specification

Customer service

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