

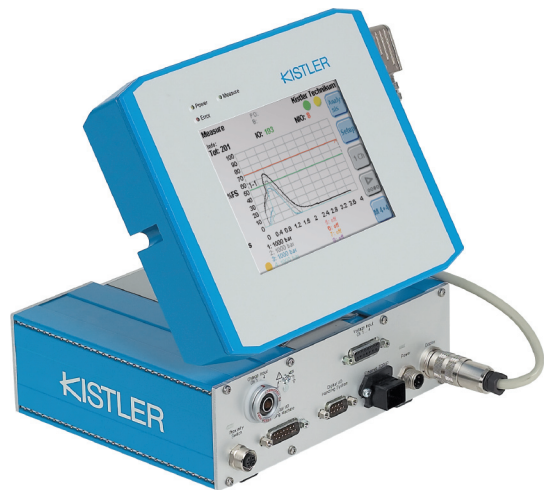
# CoMo<sup>®</sup> Injection

Type 2869A...

## Zero-Defect Production during Injection Molding thanks to Process Monitoring

CoMo Injection is an 8-channel production optimization, control and monitoring system for plastic injection molding and is supplemented by a database system with statistical functions and reporting. This all-in-one unit contains all the functions needed for evaluating the injection molding process. Signals can be directly acquired and evaluated from the injection molding machine or other sensors, as well as from piezoelectric cavity pressure sensors.

- All-in-one unit
- 8-channel process monitoring and visualization
- Real-time control of the injection molding process
- Separation of good/bad parts
- Optional 5,7" touch display
- Compact robust unit (no PC required)
- Multi-channel cable technology
- Network or stand-alone version
- Data stored on a database server
- Process and quality documentation



### Description

CoMo Injection fits specifically to the requirements of the injection molding production process. The 8 inputs can optionally be 8 pressure or 4 pressure and 4 voltage channels. The system is equipped with multi-channel cable technology, so that a cavity pressure sensor can be connected. This technology means that up to 8 sensors can be connected with just one connector to the mold and one connecting cable to CoMo Injection. The charge amplifiers have a measuring range of 2 000 up to 50 000 pC. The voltage inputs have a measuring range of 0 ... 10 V. Real time switching functions are integrated for controlling the injection molding process. 16 monitoring functions allow meticulous reject separation. The injection molding machine or scrap separation devices can be directly controlled via dry contacts.

The visualization of the process and calculated data on the machine as well as the configuration of the system are performed by the optional operating unit or a PC. The operation of CoMo Injection has been adapted to the sequence of operations of the molding process (setting-up, starting, production). The required inputs have been reduced to a minimum. Configuration data is saved with reference to the mold and article. Up to 12 configuration records can be saved on the unit, whereas there are no restrictions on a network use.

Suitable for network operation, CoMo Injection can be easily integrated into existing company networks. The web browser technology allows access via any PC in the protected network without additional software. User management limits access rights to various user levels. The process data related to a specific production order can be saved in the Kistler database CoMo-MIS Type 2829A... and evaluated with the integrated statistics software. The integration of this database into MES/ERP systems is supported.

### Application

CoMo Injection is used in the plastic injection molding process for

- mold validation and optimization
- production monitoring
- process documentation

2869A\_000-549e-08.07

### Mold Validation and Optimization

The mold cavity pressure and machine signals viewed with CoMo Injection are used in mold validation and optimization to evaluate the optimum setting parameters, minimize the cycle time and assess process reliability. Real-time switching functions are available both during optimization and during the subsequent production stage for controlling the process. This can take the form, for example, of switching from injection to holding pressure or a cascade control. For this purpose, the CoMo Injection can be connected directly to the digital inputs of the injection molding machine.

### Production

Numerous monitoring functions are provided for monitoring production. The results of these monitoring functions can be switched to one of the 12 digital outputs and connected to handling systems or scrap separation devices, in order to remove the reject parts from the batch. The production data can be filed in the Kistler database and integrated via interfaces into MES/ERP systems. CoMo Injection can be operated with or without visualization during production. Connection to a PC or display is not necessary.

### Quality Assurance and Documentation

Quality documents can be produced or current production statistically analyzed with the statistics module integrated in CoMo-MIS Type 2829A... .

### Access Rights

Six different access levels are available allowing changes to be made to various equipment settings according to the user's responsibilities.

### IT Environment

Software	Windows XP Professional or Windows 2000 Internet Explorer 6.0 or Fire Fox Java Virtual Machine (for all PC's which communicate with CoMo Injection) issued on the CoMo Terminal CD-ROM Art. No. 7.643.027
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Windows XP® and Windows 2000® are registered trademarks of Microsoft Corporation.

### Technical Data

#### General

Number of channels		8
Measuring time	s	<180
Number of evaluation objects		16
Number of real-time thresholds		16
Reaction time for real-time thresholds	ms	10
Sampling rate	Hz	600
Cut-off frequency (-3 dB)	Hz	184
Dimensions (excluding display)	mm	208x65x172
Operating temperature	°C	0 ... 50
Voltage supply	VDC	18 ... 30
Current consumption	A	0,6
Current consumption (incl. display 5,7" and external measuring amplifier)	A	1,2
Supply for external measuring transducer and proximity switch	VDC	24
Max. current consumption external measuring amplifier	A	0,2
Max. current consumption proximity switch	A	0,05
Ethernet RJ45 10 base-T, electrically isolated, twisted pair		

#### Charge Inputs

Number		2 x 4, 1 x 4, 1 x 8
Measuring range	pC	±2 000 ... ±50 000
Range 1	pC	±2 000
Range 2	pC	±5 000
Range 3	pC	±20 000
Range 4	pC	±50 000
Drift		
at 25 °C	pC/s	<0,1
at 50 °C	pC/s	<0,5

#### Voltage Inputs

Number		max. 4
Type of input		differential
Measuring range	V	0 ... 10
Common-mode voltage range	V	±40
Input impedance	MΩ	>1

#### Digital Inputs

Type		Electrically separated (AC optocoupler)
Number of channels		4
Max. input voltage (constant)	VDC	±40
Switching threshold high	VDC	>8
Switching threshold low	VDC	<2
Input current at 24 V	mA	3,5

**Digital Outputs**

Type	Electrically separated (Photo MOS relay)	
Number		12
Current load, pulse <0,1 s	mA	<360
Current load (constant)	mA	<100
Impedance in the switched condition	Ω	<35
Max. voltage (constant)	VDC	±40

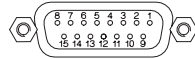
**Voltage Inputs**

**Pin Allocation**

Function	Pin
Channel 1 +	1
Channel 1 –	2
Channel 2 +	3
Channel 2 –	4
Channel 3 +	5
Channel 3 –	6
Channel 4 +	7
Channel 4 –	8
+24 V	9
--	10,11,12,13,14
GND 24 V	15

Type:  
D-Sub 15 pin neg.

Voltage Input  
Ch 1 ... 4

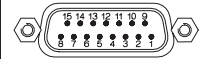


**Digital I/O Auxiliary**

**Pin Allocation**

Function	Default Allocation	Pin
DI_1	Reserve1_in	1
DI_2	Reserve2_in	2
DI_3	Reserve3_in	3
DI_4	Reserve4_in	4
Reference point_in		5
open		6
DO_1	EO-Result1_out	7
DO_2	EO-Result2_out	8
DO_3	EO-Result3_out	9
DO_4	EO-Result4_out	10
DO_5	EO-Result5_out	11
DO_6	EO-Result6_out	12
DO_7	EO-Result7_out	13
DO_8	EO-Result8_out	14
Reference point_out		15

Type:  
D-Sub 15 pin male  
Digital I/O Auxiliary

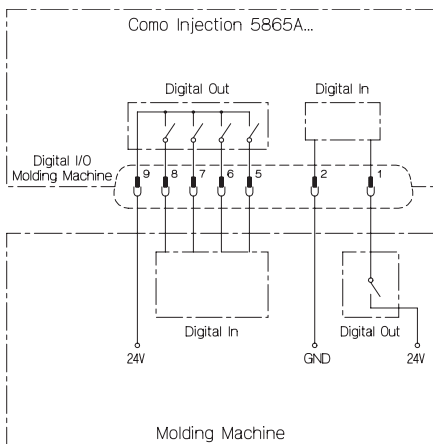
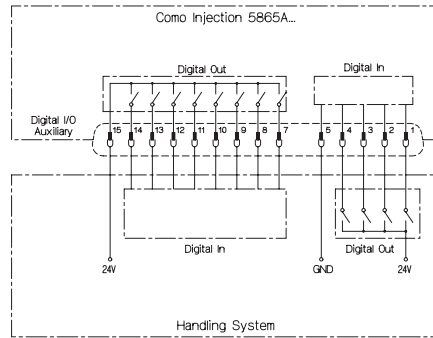
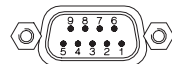


**Digital I/O Molding Machine**

**Pin Allocation**

Function	Default Allocation	Pin
DI_1	Cycle start_in	1
Reference point_in		2
open		3
open		4
DO_1	Ready measure_out	5
DO_2	Universal1_out	6
DO_3	Universal2_out	7
DO_4	Universal3_out	8
Reference point_out		9

Type:  
D-Sub 9 pin male  
Digital I/O Molding Machine



**Proximity Switch**

**Pin Allocation**

Function	Pin
+24 V	1
Factory Reset*	2
Trigger	3
Factory Reset*	4
EGND	5

Type:  
M12, 5 pin neg.  
Proximity Switch



\* short-circuiting the two pins resets the unit to the factory settings.

**Supply**

**Pin Allocation**

Function	Pin
+24 VDC_Power	1, 4
GND 24 V	2, 3

Type:  
M12, 4 pin neg.



2869A\_000-549e-08.07

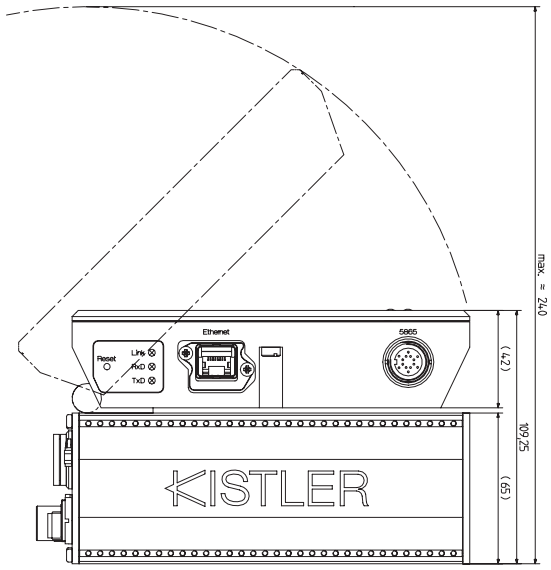


Fig. 1: Dimensions CoMo Injection Type 2869A... with mounting joint

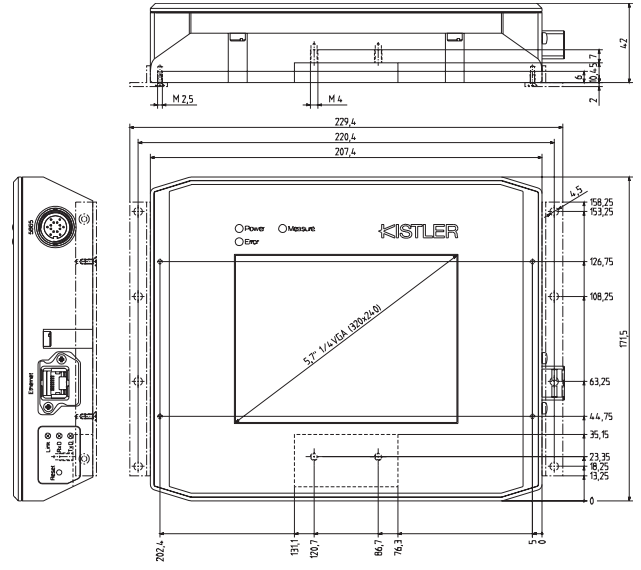


Fig. 2: Dimensions CoMo Injection touch display 5,7" Type 5629A1

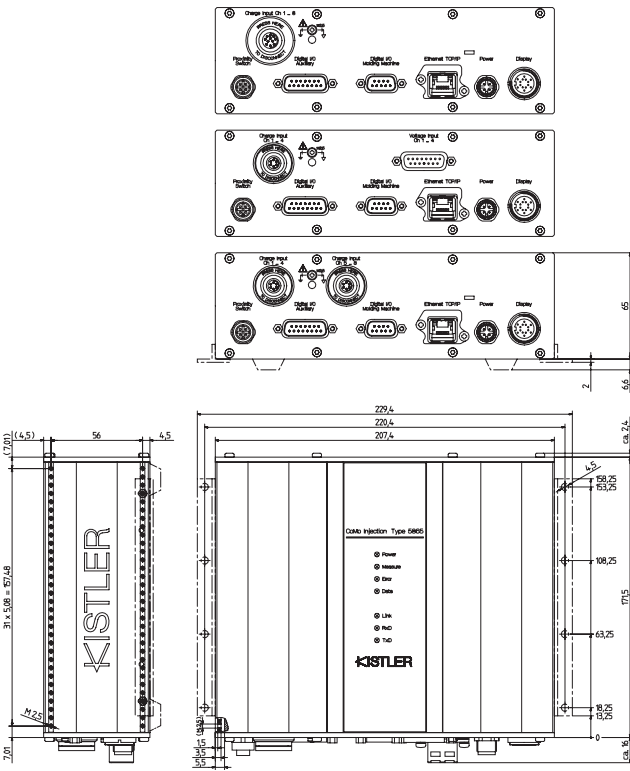


Fig. 3: Dimensions CoMo Injection measuring and control unit Type 5865A...

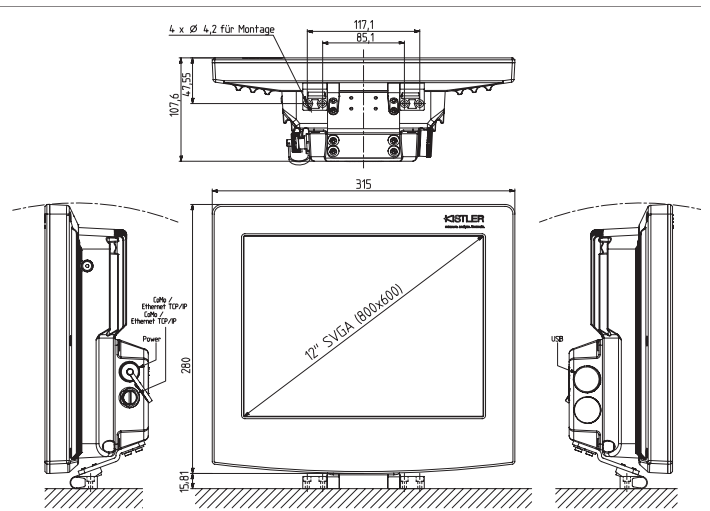


Bild 4: Dimensions CoMo Injection touch display 12,1" Type 5629A3

2869A\_000-549e-08.07

Process Data Views in CoMo Injection

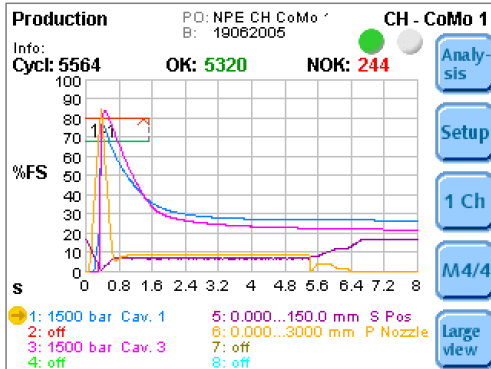


Fig. 5: Curve view



Fig. 6: Actual values of the evaluation objects

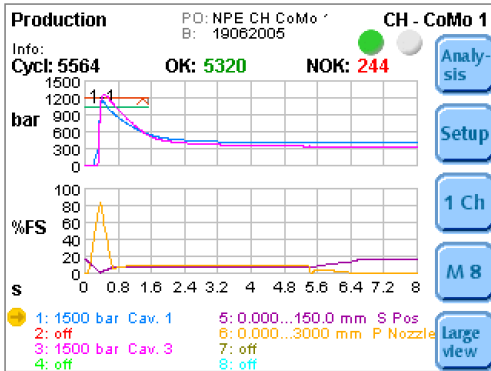


Fig. 7: 2 x 4 curves in one view

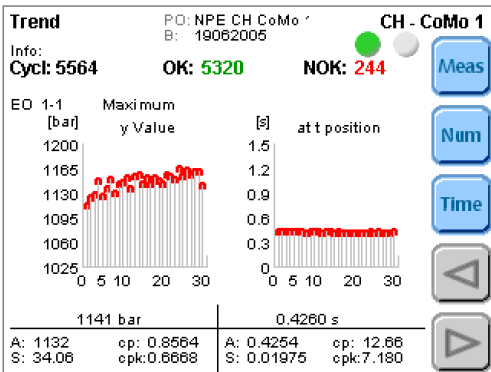


Fig. 8: Graphical trend

Process Data Views in PC's/Laptops (Large View) / 12,1" display

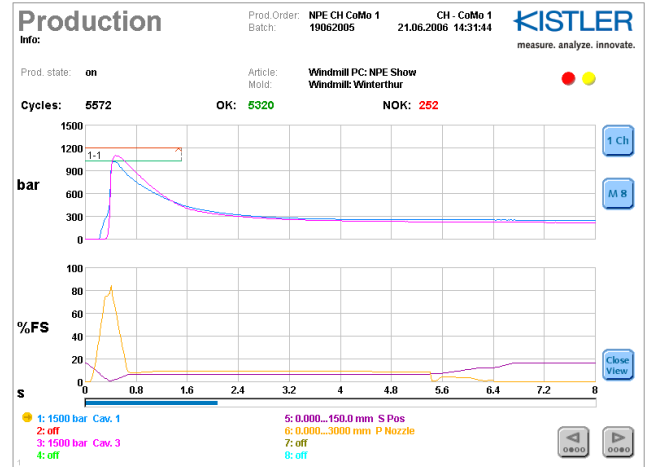


Fig. 9: 4 + 4-channel view

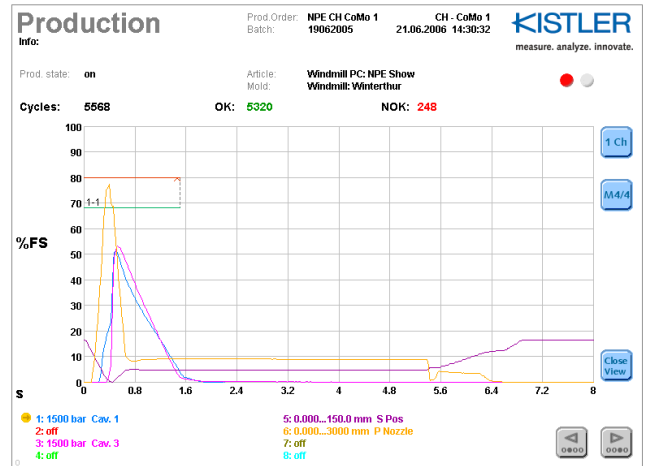


Fig. 10: 8-channel view

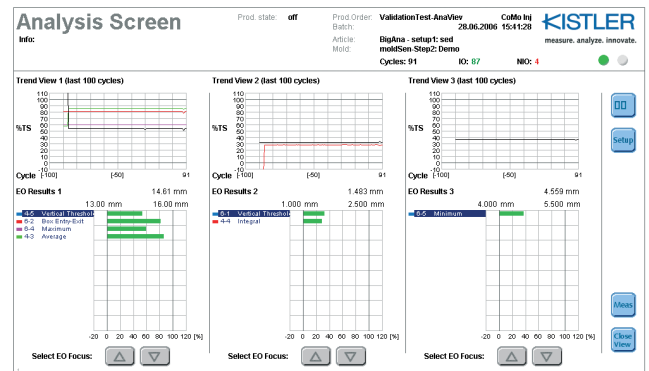


Fig. 11: Overview

2869A\_000-549e-08.07

**Connection of External Devices**

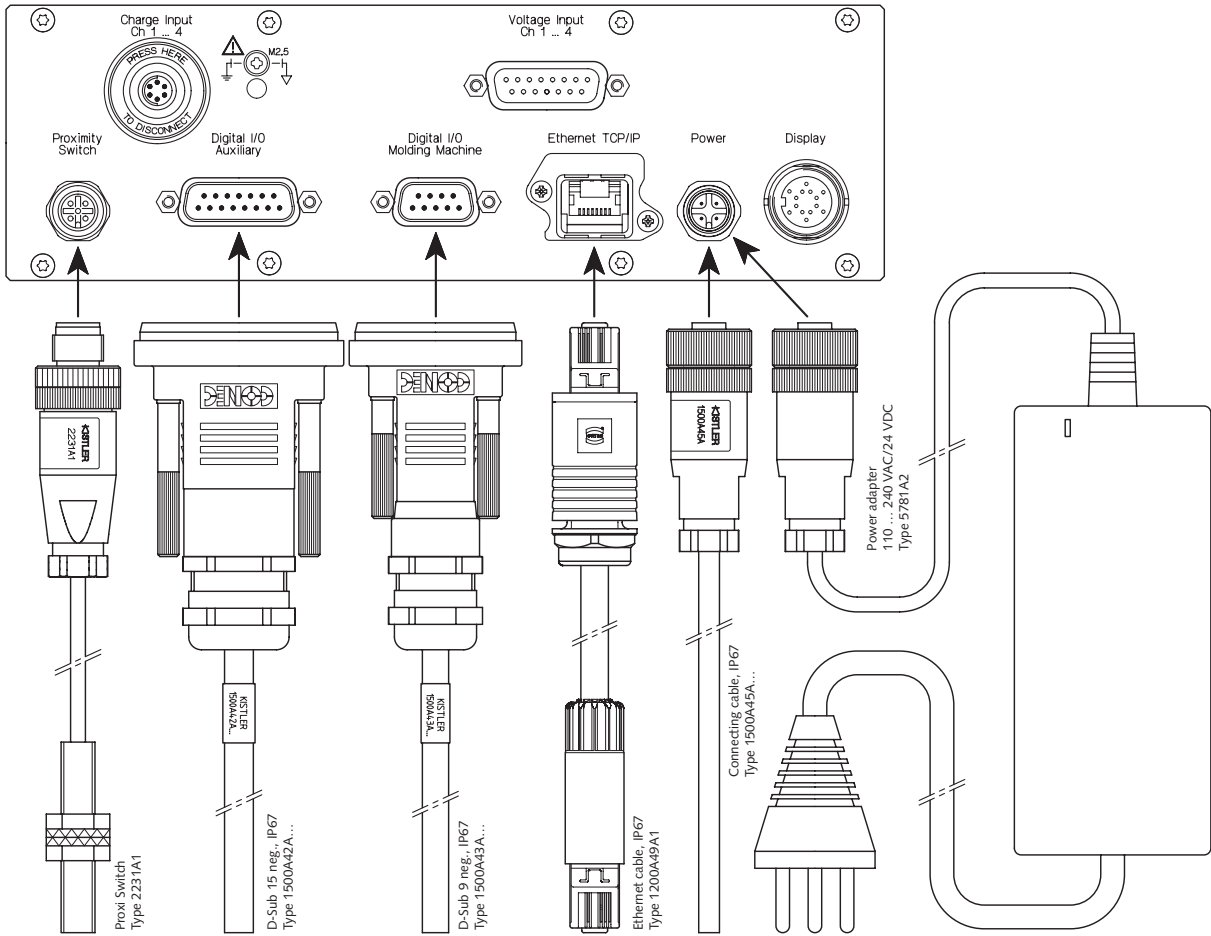


Fig. 12: CoMo Injection Type 2869A... interfaces

2869A\_000-549e-08.07

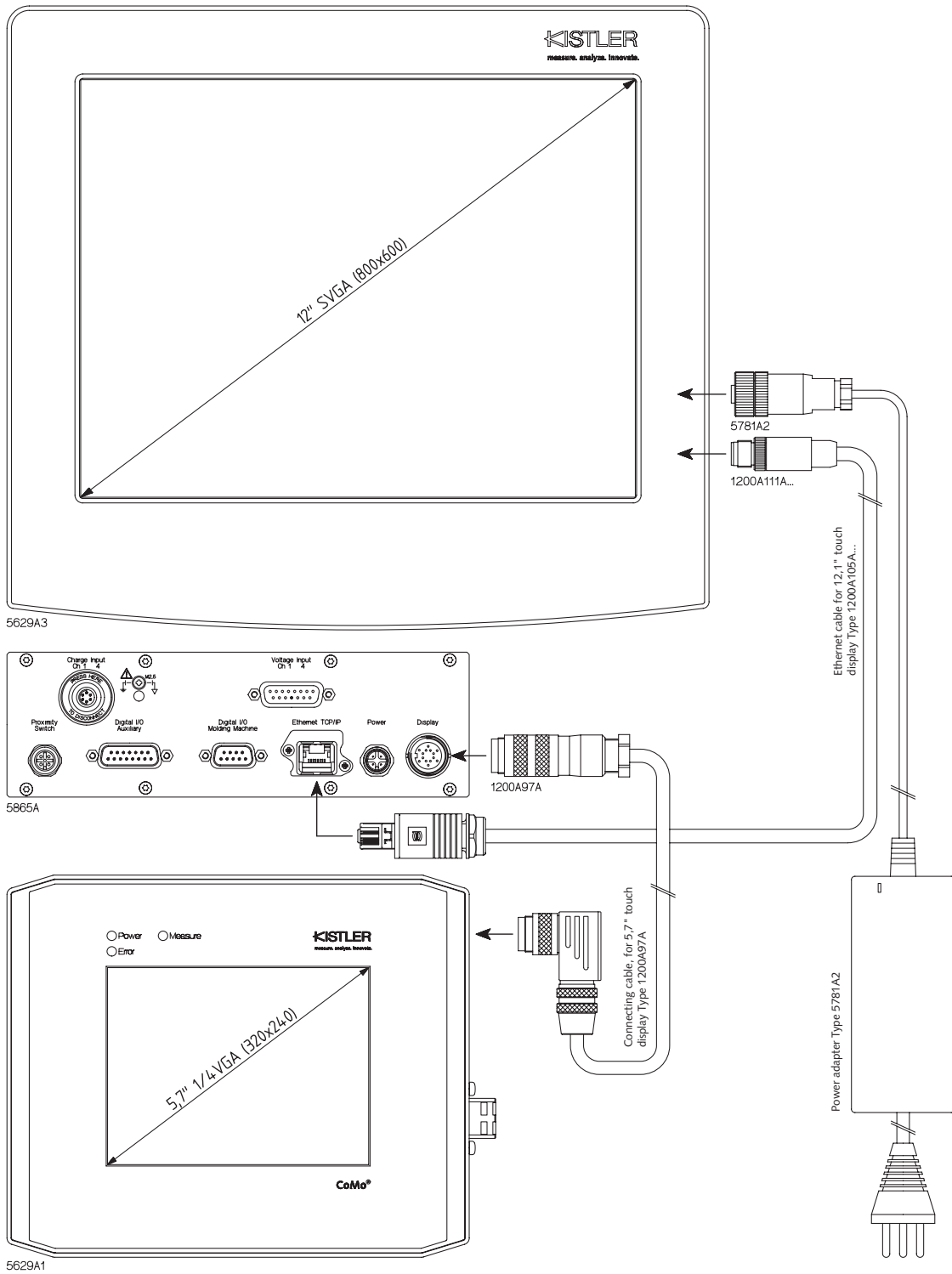


Bild 13: Connection of touch display to measuring unit

2869A\_000-549e-08.07

**Connection of Cavity Pressure Sensors (max. 8, 1 x 8)**

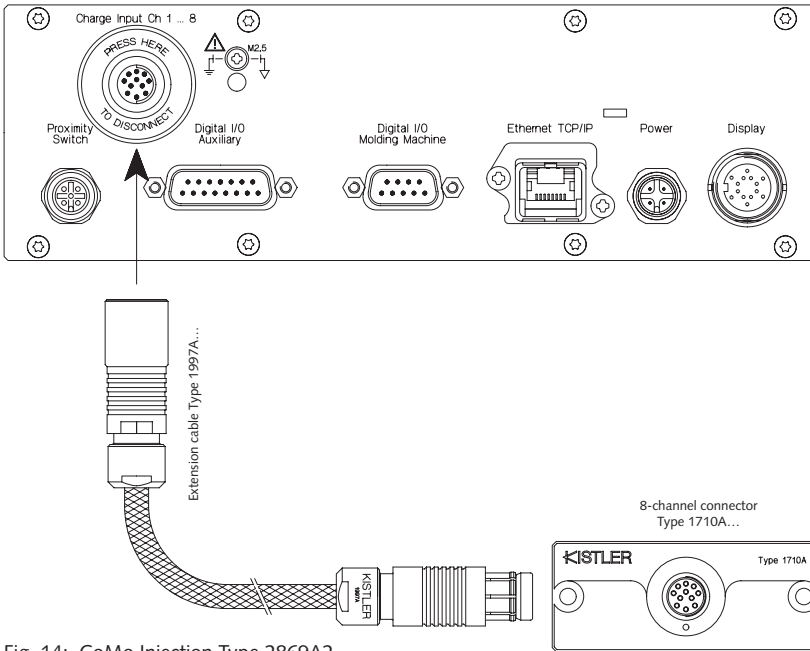


Fig. 14: CoMo Injection Type 2869A2

**Connection of Cavity Pressure Sensors (max. 8, 2 x 4)**

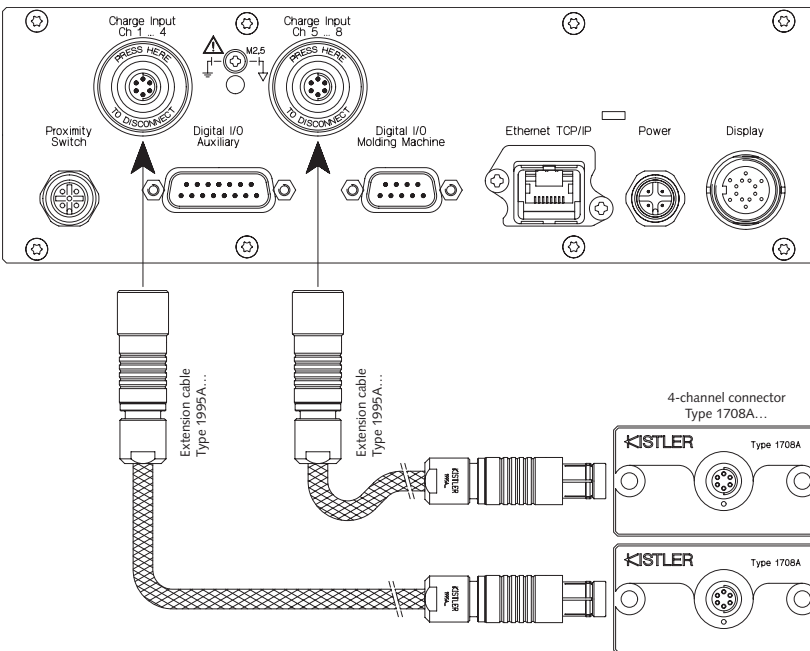


Fig. 15: CoMo Injection Type 2869A0

2869A\_000-549e-08.07



**Connection of Cavity Pressure Sensors (max. 4) and Machine Signals (max. 4)**

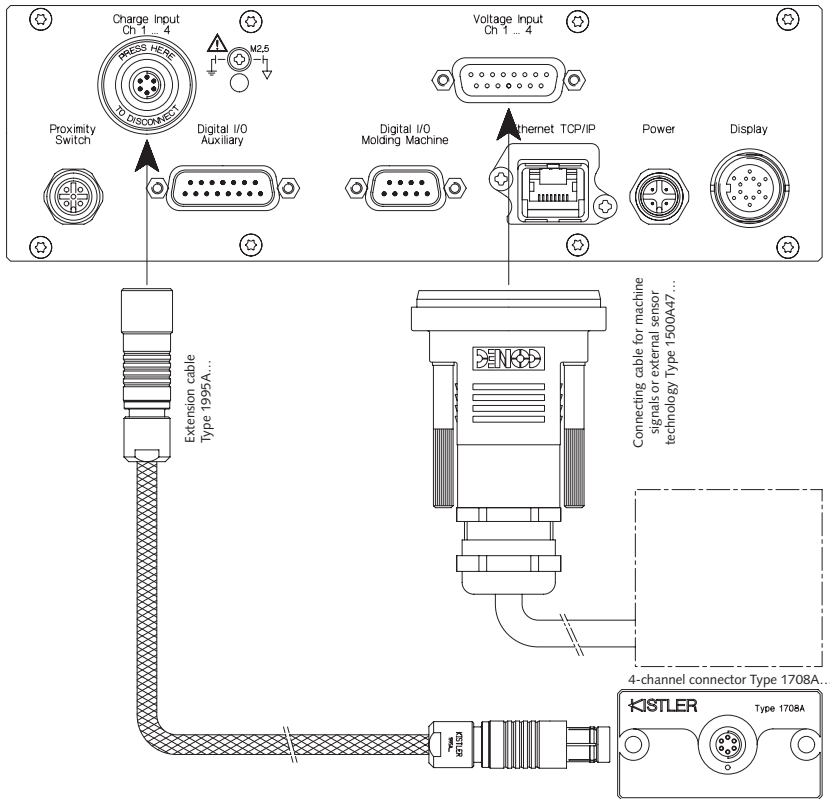


Fig. 16: CoMo Injection Type 2869A1

**Connector combined with Pressure/Temperaturesensors Type 6190.../6189... with Temperature Amplifier Type 2205**

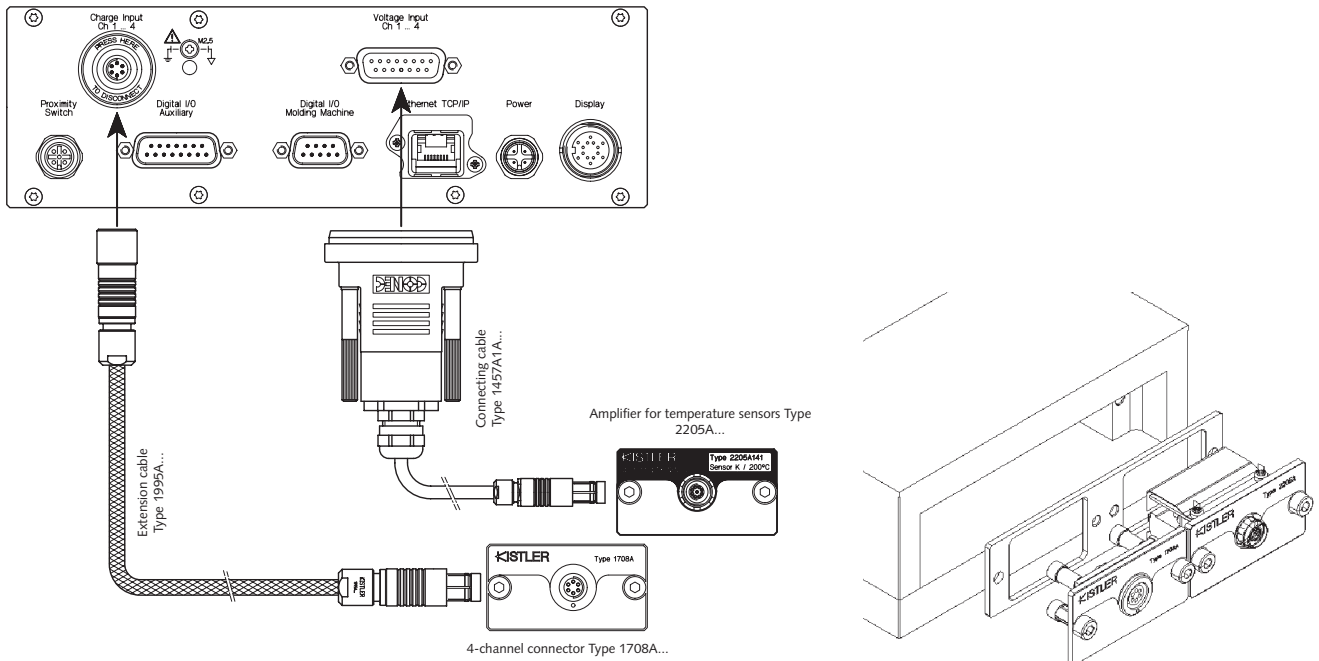


Fig. 17: CoMo Injection Type 2869A1

2869A\_000-549e-08.07

**Connection of Cavity Pressure Sensors (max. 8, 2 x 4), for Molds with Single Fischer Connector**

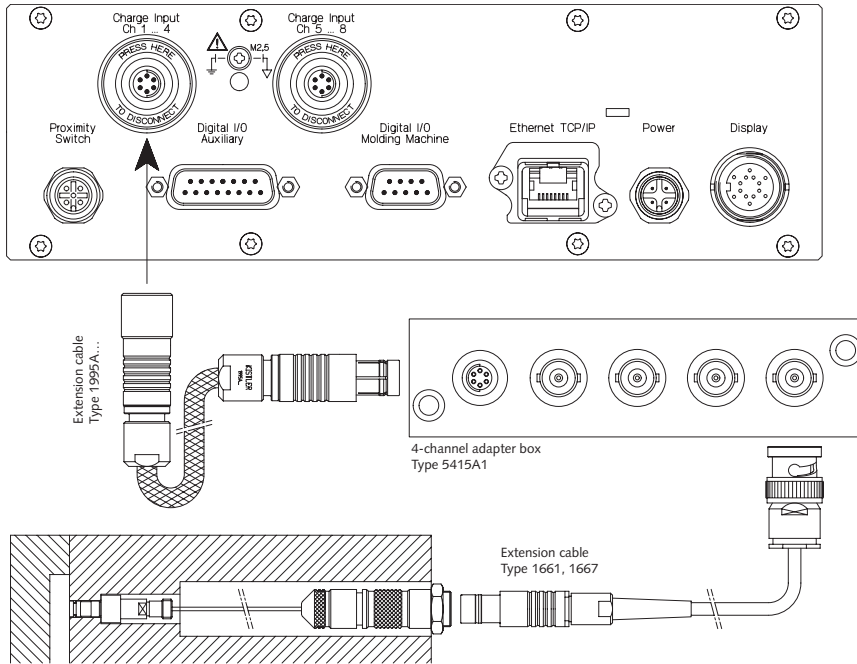


Fig. 18: CoMo Injection Type 2869A0

**Connection of Cavity Pressure Sensors (max. 8, 1 x 8), for Molds with Single Fischer Connector**

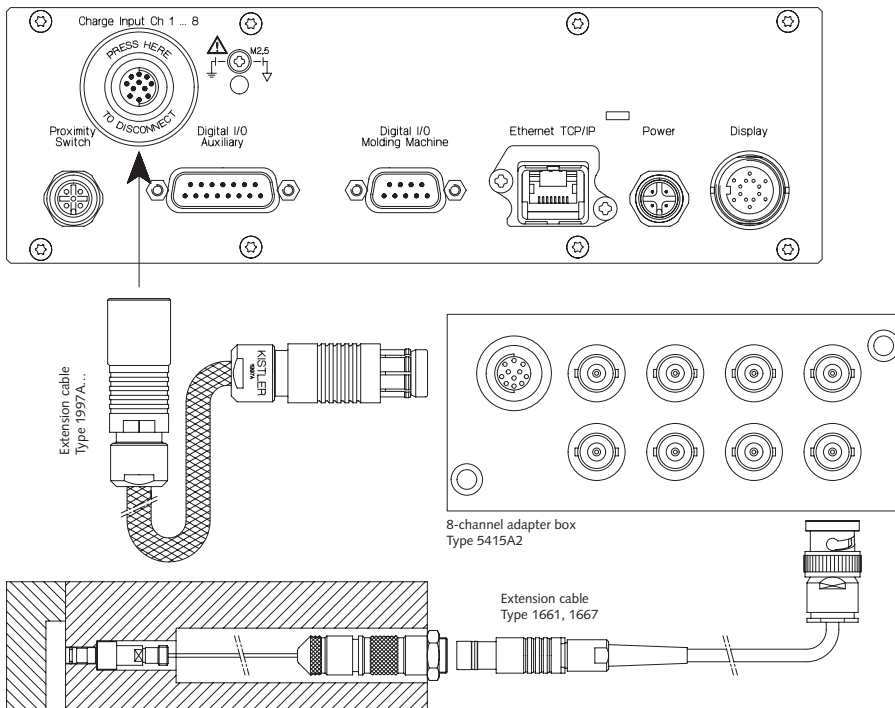


Fig. 19: CoMo Injection Type 2869A2

2869A\_000-549e-08.07

<b>Accessories Included</b>	<b>Type/Art. No.</b>	<b>Measuring Unit Accessories</b>	<b>Type/Art. No.</b>
<ul style="list-style-type: none"> <li>• CoMo Injection</li> <li>• Ethernet cable crossed, RJ45, 5 m, IP67</li> <li>Mounting set comprising 2 mounting brackets plus 4 fastening screws</li> <li>• Case feet self-adhesive black</li> <li>• CD-ROM with software for CoMo Injection Type 5865... incl. control unit Type 5629A... and instruction manuals</li> </ul>	5865A... 1200A49A1 7.511.339 5.211.368 7.643.027	Connecting cable power supply for direct connection, IP67, with bare cable end <ul style="list-style-type: none"> <li>• Length l = 0 m (connector only)</li> <li>• Length l = 7 m</li> <li>• Custom length (L<sub>min</sub> = 1 m/L<sub>max</sub> = 15 m)</li> </ul> Connecting cable, IP67, with bare cable end for digital handling signals <ul style="list-style-type: none"> <li>• Length l = 0 m (connector only)</li> <li>• Length l = 7 m</li> <li>• Custom length (L<sub>min</sub> = 1 m/L<sub>max</sub> = 15 m)</li> </ul> Connecting cable, IP67, with bare cable end for digital machine signals <ul style="list-style-type: none"> <li>• Length l = 0 m (connector only)</li> <li>• Length l = 7 m</li> <li>• Custom length (L<sub>min</sub> = 1 m/L<sub>max</sub> = 15 m)</li> </ul> Connecting cable, IP67, with bare cable end for analog machine signals 0 ... ±10 V <ul style="list-style-type: none"> <li>• Length l = 0 m (connector only)</li> <li>• Length l = 7 m</li> <li>• Custom length (L<sub>min</sub> = 1 m/L<sub>max</sub> = 15 m)</li> </ul>	1500A45A0 1500A45A7 1500A45Asp 1500A42A0 1500A42A7 1500A42Asp 1500A43A0 1500A43A7 1500A43Asp 1500A47A0 1500A47A7 1500A47Asp 2231A1 5781A2 5783A1
<b>Accessories Touch Screen Display 5,7" ¼ VGA</b> <ul style="list-style-type: none"> <li>• Control unit with touch screen display 5,7" ¼ VGA</li> </ul> Connecting cable for touch sreen display 5,7" <ul style="list-style-type: none"> <li>• Length l = 0,35 m (included by touch sreen display 5,7" with mounting joint)</li> <li>• Length l = 2,5 m (separately to order)</li> <li>• Length l = 5,0 m (separately to order)</li> <li>• Custom length (L<sub>min</sub> = 1 m/L<sub>max</sub> = 15 m, separately to order)</li> </ul> <ul style="list-style-type: none"> <li>• Plug-in power pack for touch sreen display 5,7" 110 ... 240 V AC/24 V DC for connection per network</li> <li>• Mounting joint with mounting plate</li> </ul>	Type/Art. No. 5629A1 1200A97A0,35 1200A97A2,5 1200A97A5 1200A97Asp 5781A3 7.511.340	Inductive proximity switch incl. connecting cable l = 5 m <ul style="list-style-type: none"> <li>• Power adapter 110 ... 240 VAC/24 VDC</li> <li>• Power pack for top-hat rail 110 ... 240 VAC/24 VDC</li> </ul>	2231A1 5781A2 5783A1
<b>Accessories Touch Screen Display 12,1" SVGA</b> <ul style="list-style-type: none"> <li>• Control unit with touch screen display 12,1" SVGA incl. mounting joint</li> </ul> Connecting cable/network cable for touch touch display 12,1" to 5865A... <ul style="list-style-type: none"> <li>• Length l = 0,5 m</li> <li>• Length l = 2,0 m</li> <li>• Length l = 5,0 m</li> <li>• Custom length (L<sub>min</sub> = 0,35 m/L<sub>max</sub> = 15 m, separately to order)</li> </ul> Connecting cable power supply for direct connection, with bare cable end <ul style="list-style-type: none"> <li>• Length l = 0,0 m (connector only)</li> <li>• Length l = 7,0 m</li> <li>• Custom length (L<sub>min</sub> = 1 m/L<sub>max</sub> = 15 m)</li> <li>• Power adapter 110 ... 240 VAC/24 VDC</li> <li>• Power pack for top-hat rail</li> </ul>	Type/Art. No. 5629A3 1200A111A0,5 1200A111A2 1200A111A5 1200A111Asp 1500A45A0 1500A45A7 1500A45Asp 5781A2 5783A1	<b>Optional Accessories</b> <ul style="list-style-type: none"> <li>• 4-channel connector</li> <li>• 8-channel connector</li> <li>• 4-channel extension cable</li> <li>• 8-channel extension cable</li> <li>• CD-ROM with Software for CoMo-MIS (Manufacturing Information System)</li> <li>• 4-channel adapter box, BNC to multi pincable</li> <li>• 8-channel adapter box, BNC to multi pincable</li> <li>• 2-/4-channel amplifier for temperature sensors</li> <li>• Connecting cable for temperature Amplifier</li> </ul>	Type/Art. No. 1708A... 1710A... 1995A... 1997A... 2829A... 5415A1 5415A2 2205A... 1457A1A...

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## Ordering Key

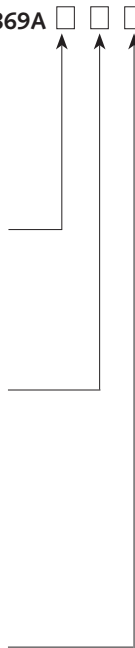
Type 2869A

CoMo Injection – 8-channel measuring and control unit Type 5865A...

2 x 4 charge inputs	0
1 x 4 charge inputs and 1 x 4 voltage inputs	1
1 x 8 charge inputs	2

No display	0
Touch touch display 5,7" Type 5629A1	1
Touch touch display 5,7" Type 5629A1 with mounting joint Art. No. 7.511.340 and connecting cable Type 1200A97A0.35	2

Power adapter 110 ... 240 VAC/24 VDC Type 5781A2	0
Connector IP67 for 24 V DC supply of machine, Type 1500A45A0	1
Cable for 24 VDC supply of machine Type 1500A45A7	2
Cable for 24 VDC supply of machine Type 1500A45Asp	3



## Available Instruction Manuals

- 2869A\_002-361e Instruction Manual
- 2869A\_002-362e Installation Instructions