

CoMo Injection/CoMo Injection Basic Type 2869B...

Zero-Defect Production during Injection Molding thanks to Process Monitoring

CoMo Injection is a production optimization, control and monitoring system for injection molding of plastics. All functions required for evaluation and optimization of the injection molding process are integrated into a compact unit. This unit allows direct connection of piezoelectric cavity pressure sensors, and acquisition and evaluation of signals from the injection molding machine or other sensors. Depending on the model, CoMo Injection supports 4 (Basic), 12 or 24 channels. The CoMo DataCenter Type 2829B... database enhances CoMo Injection's capabilities with curve analysis, statistics functions and reporting.

- Compact robust All-in-one unit
- Process monitoring and visualization up to 24 channels
- Real-time control of the injection molding process¹
- Automatic hot runner balancing (optional)
- Separation of good/bad parts
- Visualization and operation with touch screen display (SVGA 12,1") or Webbrowser
- No PC required
- Multi-channel cable technology
- Network or stand-alone version
- Optional saving of data in a central database
- Process and quality documentation

Description

CoMo Injection fits specifically to the requirements of the injection molding production process. As the 4-channel version CoMo Injection Basic is equipped with inputs for four piezoelectric pressure sensors. The inputs of the 12-channel version are designed as 8 pressure and 4 voltage channels. The 24-channel version has 16 pressure and 8 voltage inputs. The system is equipped with multi-channel cable technology. 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.

Up to 48 monitoring functions guarantee reliable reject separation on the basis of the recorded data. At the same time the injection molding process can be controlled using real-time thresholds¹. Injection machine or reject diverters can be controlled directly via 12 digital outputs.

CoMo Injection is available with the option of MultiFlow automatic hot runner balancing for multicavity molds. The cavity pressure profiles are used to optimize the hot runner tempera-



tures for synchronous filling of all cavities. The new temperature set points are automatically transferred to the controller or machine via an interface. This produces a closed control loop, which automatically ensures synchronized filling of all cavities. The hot runner is balanced automatically during multicavity mold start-up. This completely avoids any need for manual optimization. Rebalancing is performed automatically during production.

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.

CoMo Injection can be easily integrated into existing company networks. The process data related to a specific production order can be saved in the Kistler database CoMo DataCenter Type 2829B... and evaluated with the integrated modules process statistics and Curve Viewer.

¹ Optional in the case of the CoMo Injection Basic Type 2869B0...

Application

CoMo Injection is used in the plastic injection molding process for

- mold validation and optimization
- production monitoring
- process documentation

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 functions¹ are available both during optimization and during the subsequent production stage for controlling the process. This allows implementation of a wide variety of control functions, such as cavity pressure based changeovers from injection to holding pressure, or cascade control. With the MultiFlow option, multicavity molds are balanced automatically.

Production monitoring

Numerous monitoring functions are available for production monitoring and reject separation. The results of these functions can be linked with the 12 digital outputs, enabling a connected handling system or a reject diverter to remove the rejected parts reliably from the batch.

Production documentation

There is also the option of saving the production data in the CoMo DataCenter Type 2829B... . The saved curves can be displayed and analyzed with the Curve Viewer module. The Process Statistics module allows automated production of quality documentation and statistical analysis of production.

IT Environment for Network Access to CoMo Injection

Any operating system

Web browser with Java Virtual Machine (for Windows®, included on the CoMo CD-ROM, Art. No. 7.643.027)

IT environment for backup/restore service

Windows XP® Professional, Windows 2000®, Windows Vista® or Windows 7®

Supported Hot Runner Controllers:

The list of these is constantly being expanded. Please contact your local Kistler distributor.

¹ Optional in the case of the CoMo Injection Basic Type 2869B0...

Technical Data

General

Number of channels		4/12/24
Measuring time	s	<600
Number of evaluation objects		48
Number of real-time thresholds	per channel	up to 2
Jitter real-time thresholds	ms	<0,18
Reaction time real-time thresholds	ms	<4
Sampling rate	Hz	1 200
Cut-off frequency (-3 dB)	Hz	368
Dimensions (excluding display)	mm	208x70x172
Operating temperature	°C	0 ... 50
Voltage supply	VDC	19 ... 30
Power consumption (incl. display 12,1" and external measuring amplifier)	W	70
Supply for external measuring transducer and proximity switch	VDC	24
Max. current consumption collective external measuring amplifier	A	0,4
Max. current consumption proximity switch	A	0,05
Voltage between signal lines and case	V	<±40
Ethernet RJ45 10 base-T, electrically isolated, twisted pair		
Internal memory for tools and articles		30/60

Charge Inputs

Number	1x4 / 2x4 / 1x8 / 2x8	
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		0/4/8
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		6
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

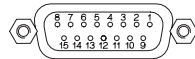
Voltage Inputs

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
24VDC	9
Reset-Operate	10
Reserved	11
Reference point_out	12
Reserved	13
Reserved	14
EGND	15

Type:
D-Sub 15 pin neg.

Voltage Input
Ch 1 ... 4

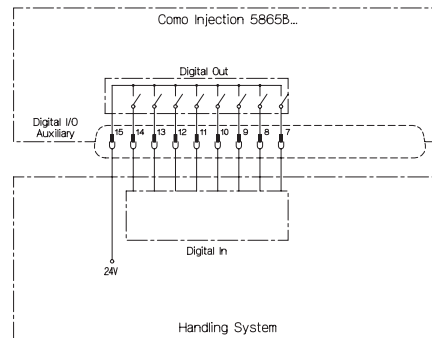
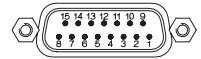


Digital I/O Auxiliary

Pin Allocation

Function	Default Allocation	Pin
Reserved		1
Reserved		2
Reserved		3
Reserved		4
Reserved		5
open		6
DO_1		7
DO_2		8
DO_3		9
DO_4		10
DO_5		11
DO_6		12
DO_7		13
DO_8		14
Reference point_out		15

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

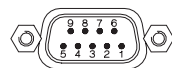


Digital I/O IMM

Pin Allocation

Function	Default Allocation	Pin
DI_1	Cycle start_in	1
Reference point_in		2
Reserved		3
open		4
DO_1	Device ready	5
DO_2	RT Tresholds	6
DO_3	EO "Sorting"	7
DO_4	Alarm	8
Reference point_out		9

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



Proximity Switch

Pin Allocation

Function	Pin
24VDC	1
Factory Reset A	2
Trigger	3
Factory Reset B	4
EGND	5

Type:
M12, 5 pin neg.
Proximity Switch

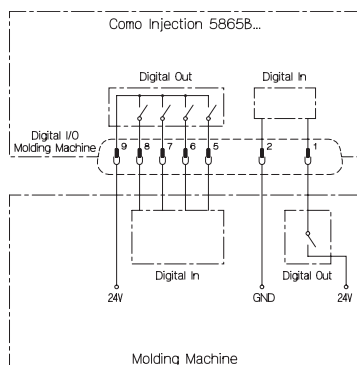


Power Supply for External Devices

Pin Allocation

Function	Pin
24VDC	1, 4
EGND	2, 3

Type:
M12, 4 pin neg.



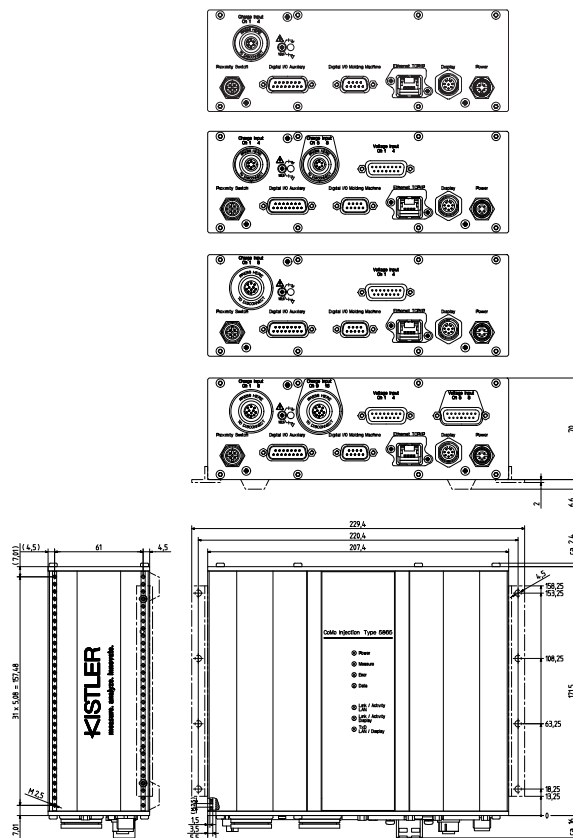


Fig. 1: Dimensions CoMo Injection measuring and control unit Type 5865B...

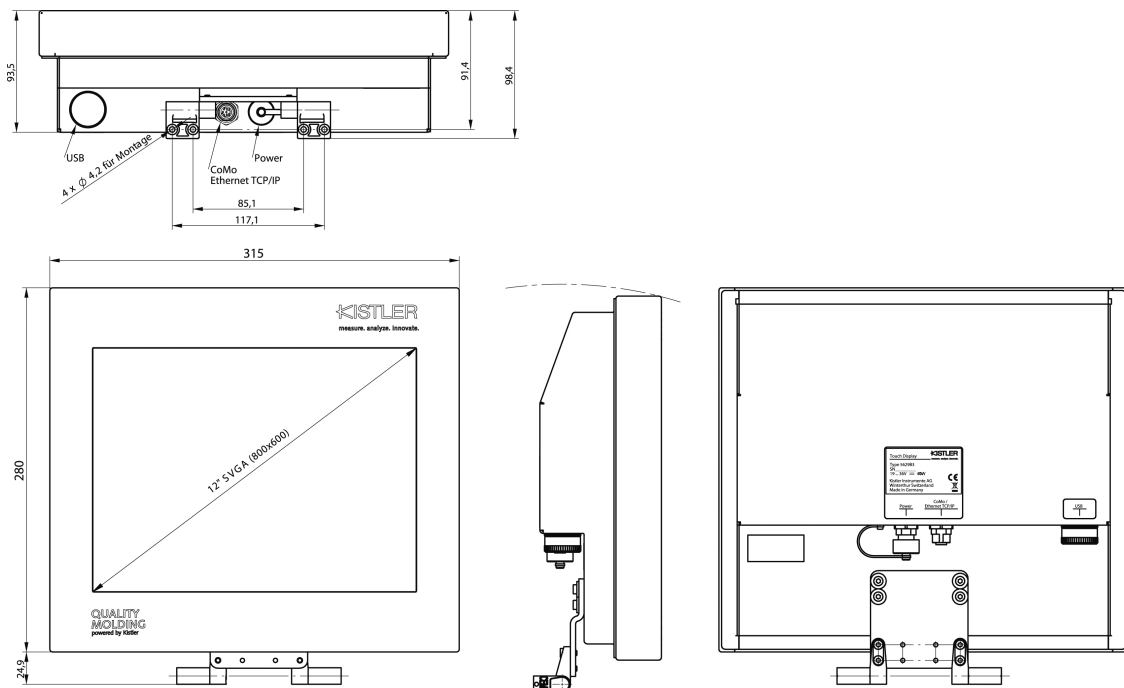


Fig. 2: Dimensions CoMo Injection touch display 12,1" Type 5629A3

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

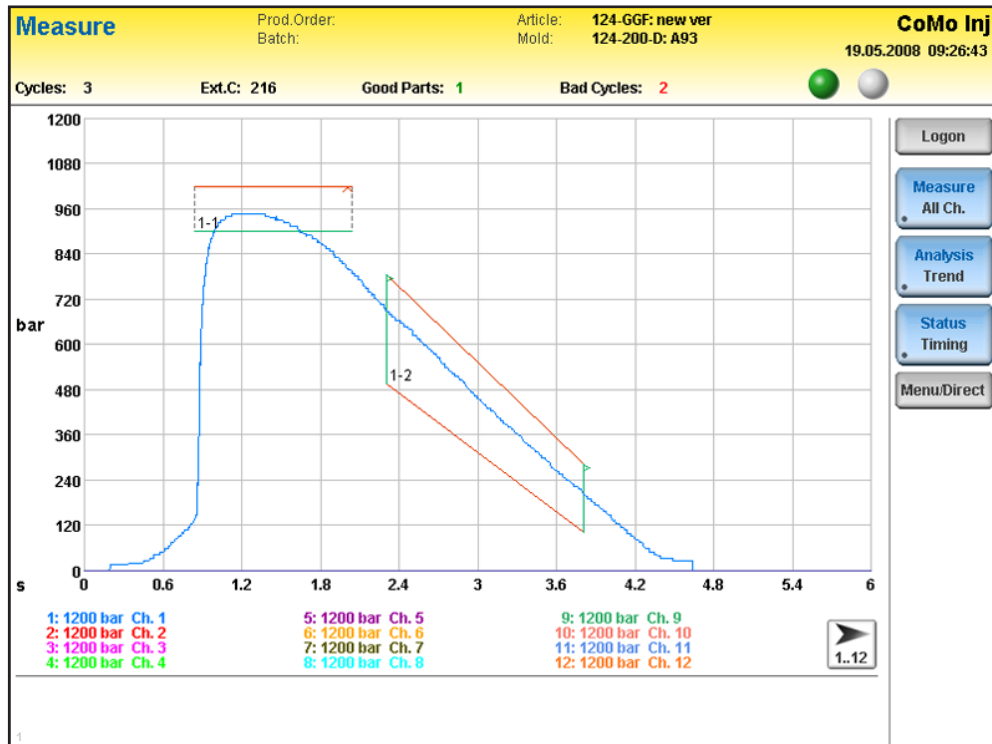


Fig. 3: Measurement view

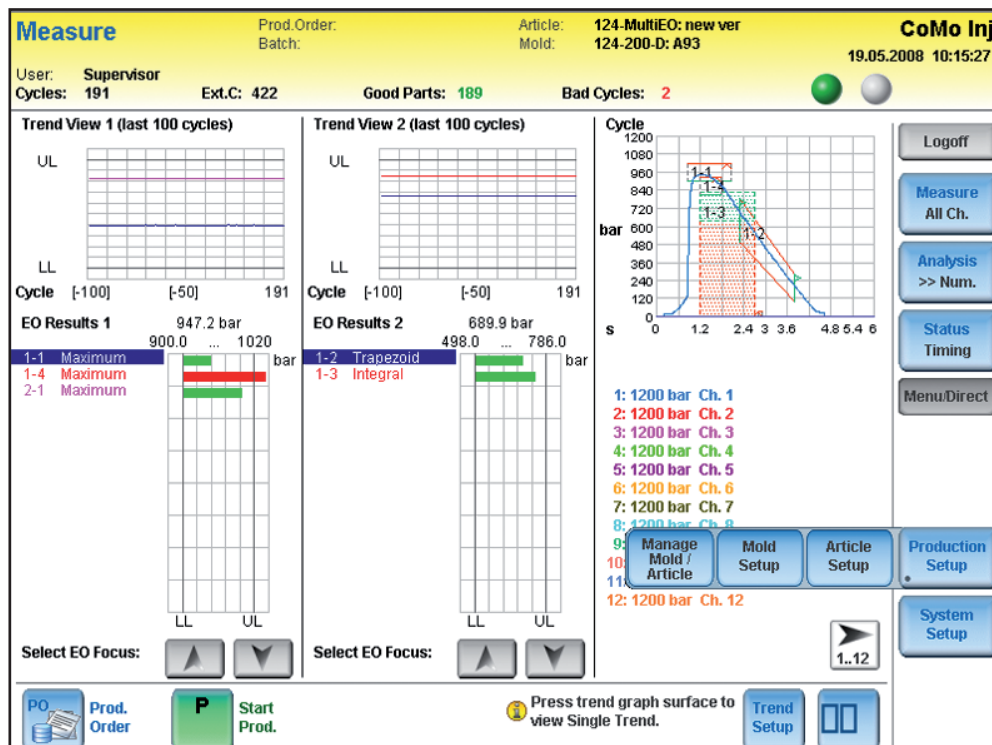


Fig 4: Overview

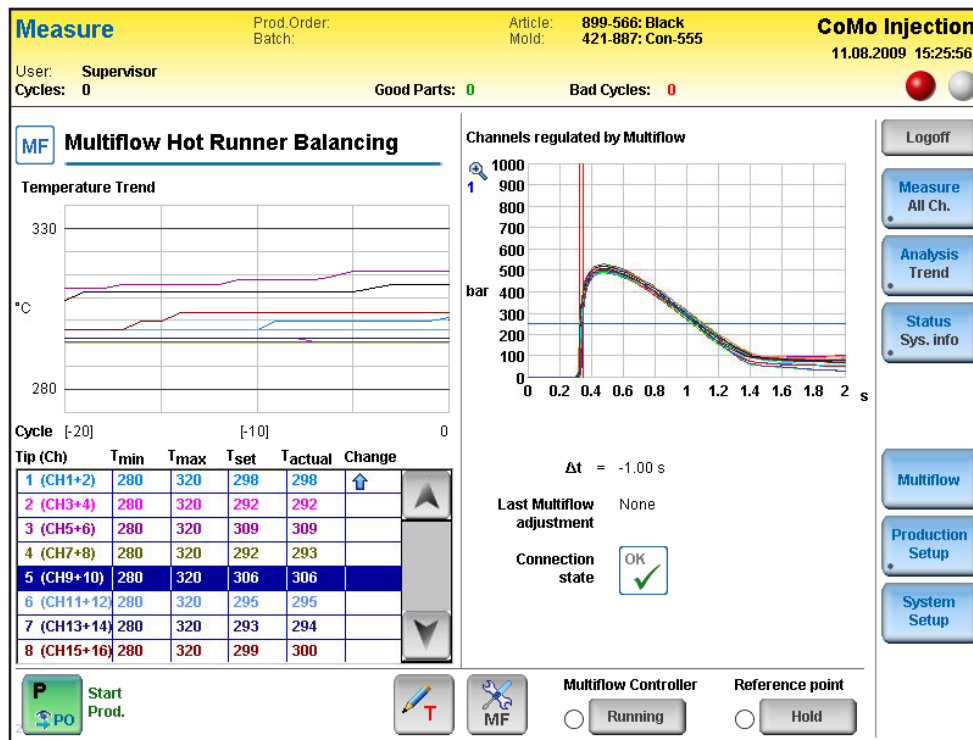


Bild 5: MultiFlow Automatic Hot Runner Balancing

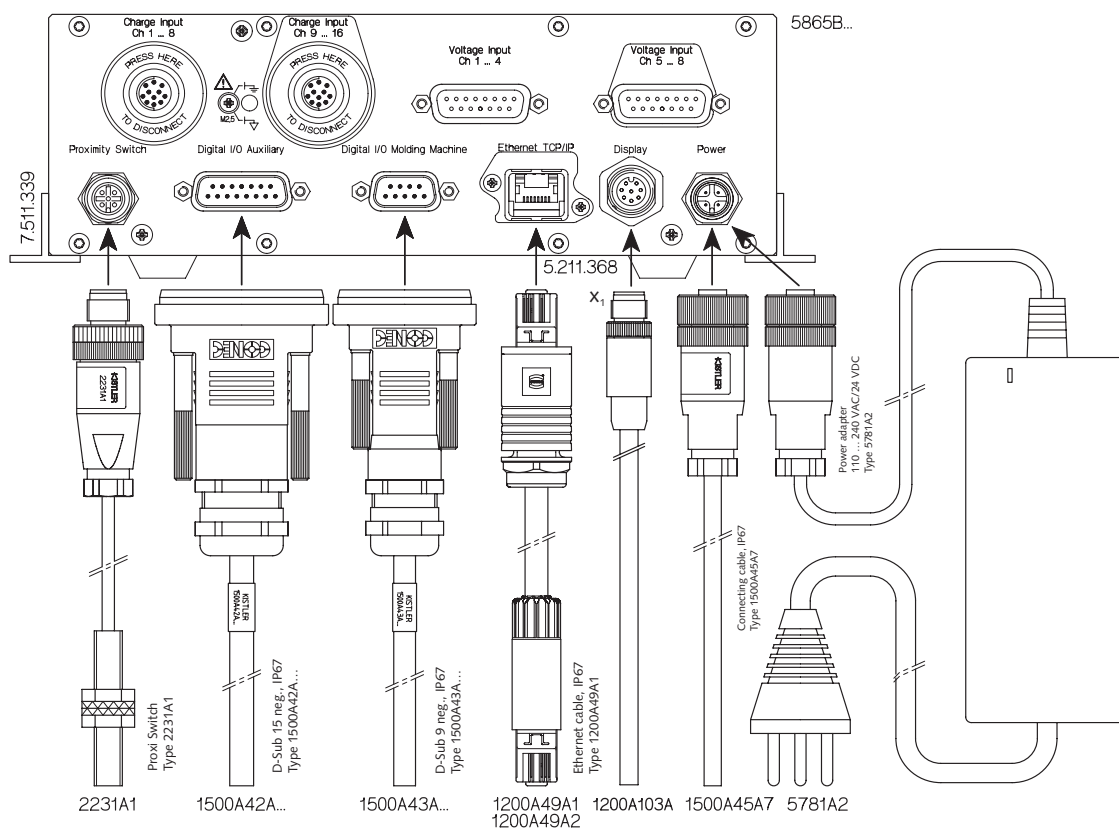


Fig. 6: Connections to the measuring unit

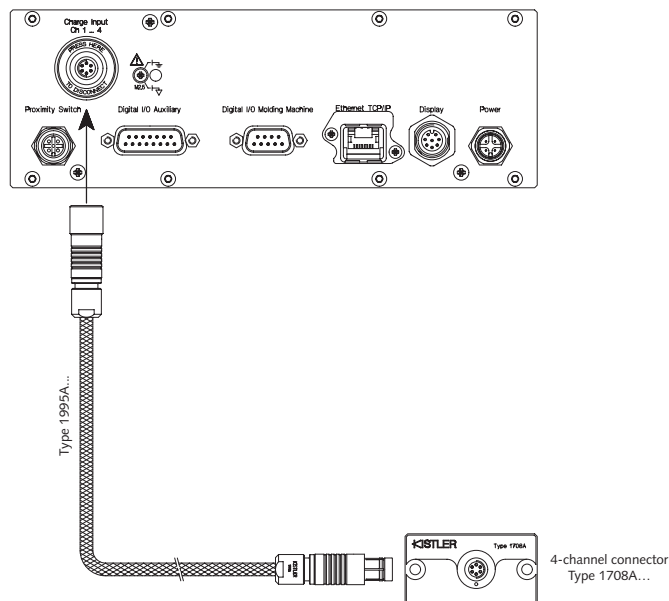
Connection of Cavity Pressure Sensors (max. 4, 1x4)


Fig. 7: CoMo Injection Type 2869B0

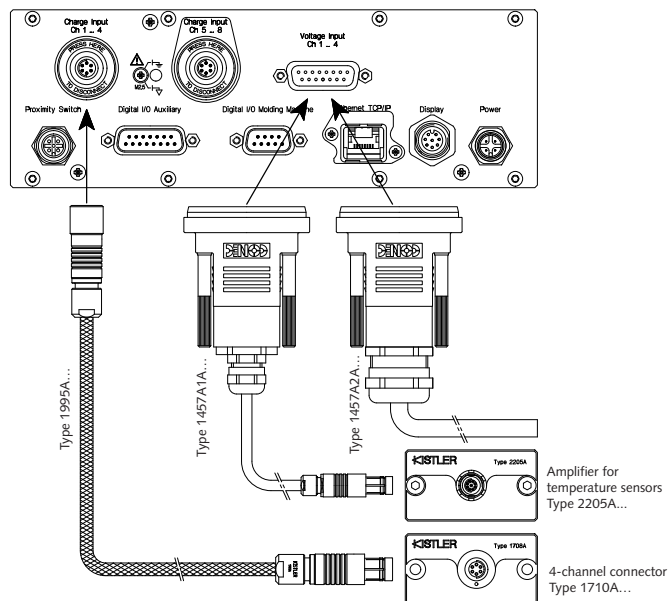
Connection of Cavity Pressure Sensors (max. 8, 2x4)


Fig. 8: CoMo Injection Type 2869B1

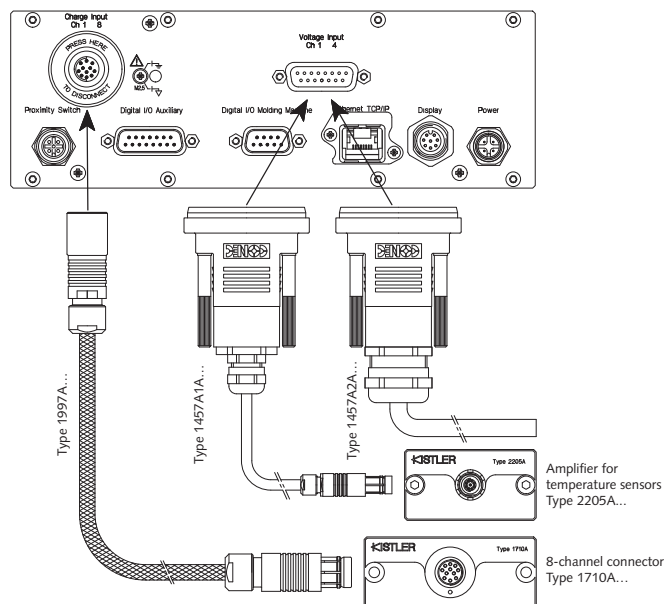
Connection of Cavity Pressure Sensors (max. 8, 2x4)


Fig. 9: CoMo Injection Type 2869B2

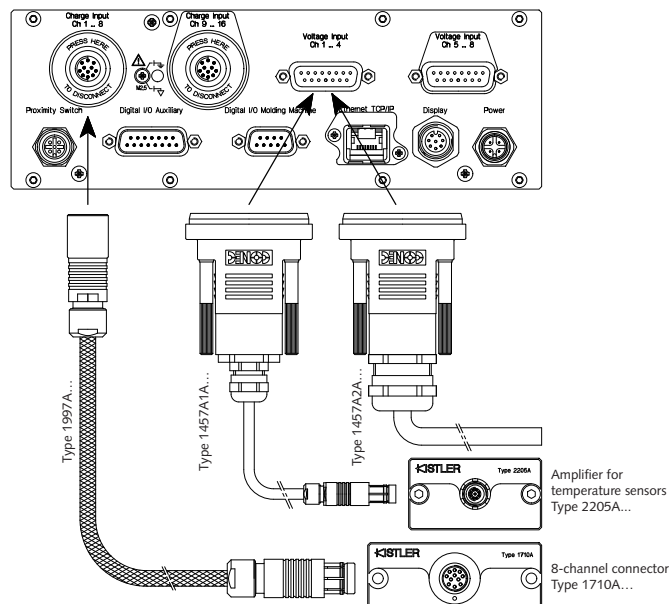
Connection of Cavity Pressure Sensors (max. 16, 2x8), Machine Signals and Pressure/Temperature Sensors


Fig. 10: CoMo Injection Type 2869B3

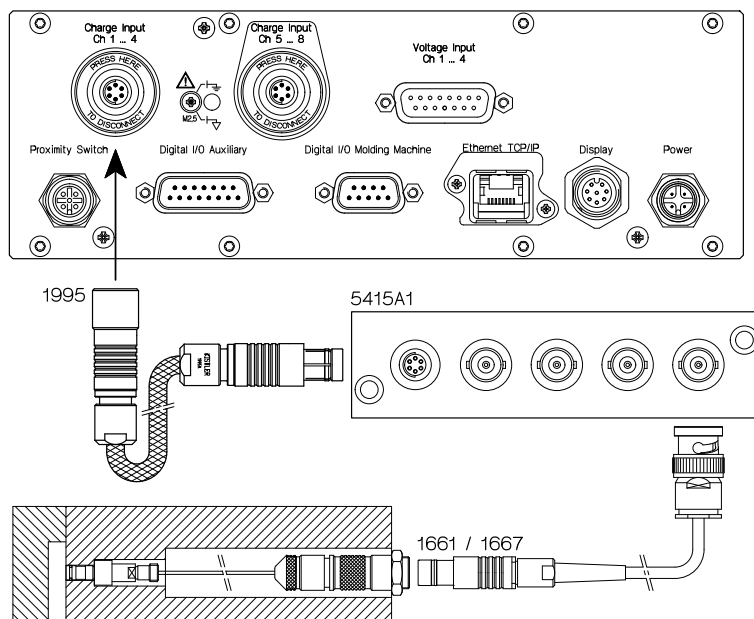
Connection of Cavity Pressure Sensors (max. 8, 2x4), for Molds with Single Fischer Connector


Fig. 11: CoMo Injection Type 2869B1

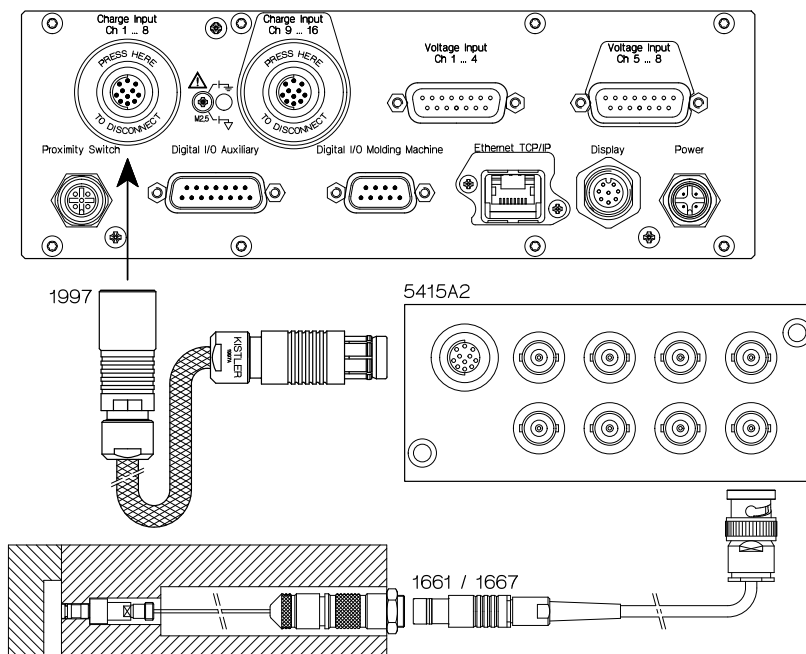
Connection of Cavity Pressure Sensors (max. 16, 2x8), for Molds with Single Fischer Connector


Fig. 12: CoMo Injection Type 2869B3

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Accessories Included

• CoMo Injection, configuration on ordering key	Type/Art. No. 5865B...
• Ethernet cable crossed, RJ45, 5 m	1200A49A1
• Mounting set comprising 2 mounting brackets plus 4 fastening screws	7.511.339
• Case feet self-adhesive black	5.211.368
• CD-ROM with software for CoMo Injection Type 2869B... incl. control unit Type 5629A1/A3 and instruction manuals	7.643.027

Accessories Base Unit

Connecting cables, D-sub 15 pin neg., IP67, with flying lead for digital signals	Type/Art. No.
• Length l = 0 m (connector only)	1500A42A0
• Length l = 7 m	1500A42A7
• Length to customer order (L _{min} = 1 m/L _{max} = 15 m)	1500A42Asp

Connecting cables, D-sub 9 pin neg., IP67, with flying lead for digital machine signals

• Length l = 0 m (connector only)	1500A43A0
• Length l = 7 m	1500A43A7
• Length to customer order (L _{min} = 1 m/L _{max} = 15 m)	1500A43Asp

• Inductive proximity switch incl. connecting cable, l = 5 m	2231A1
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• Connecting cables, supply, for M12x1 direct connection; neg. cable connector, 4 pin, IP67, with flying lead	
• Length l = 0 m (connector only)	1500A45A0
• Length l = 7 m	1500A45A7
• Length to customer order (L _{min} = 1 m/L _{max} = 15 m)	1500A45Asp

• Power adapter 110 ... 240 VAC/24VDC	5781A2
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MultiFlow Automatic Hot Runner Balancing

• MultiFlow software option for direct connection of hot runner controllers with interface (Kistler HRI)	2809A1
• MultiFlow software option with protocol converter for connection of hot runner controllers without Kistler interface	2809A2
• Custom protocol converter for connection of hot runner controllers without Kistler interface	2808A1
• Hardware converter for Ethernet to RS-232C or RS-485	2808A2

The MultiFlow function cannot be controlled with the 5.7" touch display 5629A1.

Accessories for CoMo Injection Basic:

The functionality of the CoMo Injection Basic is limited by comparison with the CoMo Injection, but can be enhanced up to the full extent with the following options:

- Enhancement of the monitoring functions (integral, box, trapezium, threshold, etc.)
- Separation of individual cavities
- Real-time thresholds
- Data export to CoMo DataCenter

Ordering Key (additional options for CoMo Injection Basic)

		Type 2806A	☐	☐	☐	☐
Monitoring Function						
no	0					
yes	1					
Digital Outputs for Part Assignment and Multi-component Support						
no	0					
yes	1					
Real-time Thresholds						
no	0					
yes	1					
Data Export to CoMo DataCenter						
no	0					
yes	1					

Touch Display 12,1" SVGA and Accessories

- Touch display 12,1" SVGA

Type/Art. No.
 5629A3

Connecting cables for 12,1" touch display 12,1"

- Length $l = 0,5$ m 1200A103A0,5
- Length $l = 2$ m 1200A103A2
- Length $l = 5$ m 1200A103A5
- Length $l = 10$ m 1200A103A10
- Length $l = 15$ m 1200A103A15

- Power adapter for 12,1" touch screen display 110 ... 240 VAC/24 VDC for operation on network

5781A2

Network cables for operation on network

- Length $l = 0,5$ m 1200A105A0,5
- Length $l = 2$ m 1200A105A2
- Length $l = 5$ m 1200A105A5
- Length to customer order 1200A105A5p
($L_{\min} = 0,35$ m/ $L_{\max} = 15$ m)

Connection system

- 4-channel connector for mounting inside mold
- 8-channel connector for mounting inside mold

1708A0

1710A0

1-channel extension cables

- Length $l = 2$ m 1991A2
- Length $l = 5$ m 1991A5
- Length to customer order 1991A5p
($L_{\min} = 1$ m/ $L_{\max} = 30$ m)

4-channel extension cables

- Length $l = 1$ m 1995A1
- Length $l = 2$ m 1995A2
- Length $l = 5$ m 1995A5
- Length to customer order 1995A5p
($L_{\min} = 1$ m/ $L_{\max} = 30$ m)

8-channel extension cables

- Length $l = 1$ m 1997A1
- Length $l = 2$ m 1997A2
- Length $l = 5$ m 1997A5
- Length to customer order 1997A5p
($L_{\min} = 1$ m/ $L_{\max} = 30$ m)

- 4-channel adapter box, BNC to multiway cable

5415A1

- 8-channel adapter box, BNC to multi-channel cable

5415A2

- Adapter box, two 4-channel connections on mold to 8-channel cable 5415A3

- Adapter box, 8-channel connection on mold to two 4-channel cables 5415A4

4-channel connecting cables with flying lead for 0 ... ± 10 V analog machine signals

- Length $l = 0$ m (connector only) 1500A47A0
- Length $l = 7$ m 1500A47A7
- Length to customer order 1500A47A5p
($L_{\min} = 1$ m/ $L_{\max} = 15$ m)

4-channel extension cables for connecting thermocouple amplifier Type 2205A... or junction box Type 5689A10

- Length $l = 1$ m 1457A1A1
- Length $l = 2$ m 1457A1A2
- Length $l = 5$ m 1457A1A5
- Length to customer order 1457A1A5p
($L_{\min} = 1$ m/ $L_{\max} = 15$ m)

- Thermocouple amplifier for 2 ... 4 Temperature sensors Type K, J, N 2205A...

- Junction box for connecting 4 voltage signals 5689A10

4-channel connecting cable for junction box/temperature amplifier with flying lead

- Length $l = 7$ m 1457B2A7
- Length to customer order 1457B2A5p
($L_{\min} = 1$ m/ $L_{\max} = 15$ m)

Ordering Key CoMo Injection

Type 2869B ☐ ☐ ☐

Base Unit

CoMo Injection Basic 4-channel with 1 x 4 charge*	0
CoMo Injection 12-channel with 2 x 4 charge and 1 x 4 voltage	1
CoMo Injection 12-channel with 1 x 8 charge and 1 x 4 voltage	2
CoMo Injection 24-channel with 2 x 8 charge and 2 x 4 voltage	3

Display

Without Display	0
With touch display, 12,1", Type 5629A3 incl. cable Type 1200A103A2	1
With touch display, 12,1", Type 5629A3 incl. cable Type 1200A103A5	2
With touch display, 12,1", Type 5629A3 incl. cable Type 1200A103A10	3
With touch display, 12,1", Type 5629A3 incl. cable Type 1200A103A15	4

Power Supply

With connector M12x1, 4 pin, Type 1500A45A0	0
with power supply 110 ... 240 VAC/24 VDC Type 5781A2	1

* With limited version of software, optional enhancement (see ordering key on p. 9)

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**QUALITY
MOLDING**
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