



I N N O V A T I N G F O R E F F I C I E N C Y

DYNA 4

OEM melt pressure transducers
for high temperatures and high pressures

Operating manual

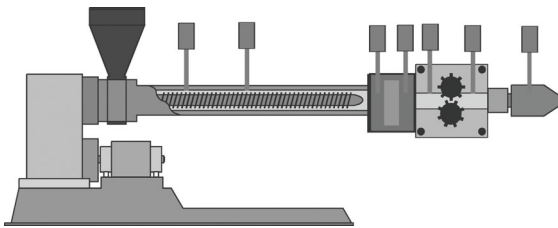












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1. General

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1.1 Important information

This manual applies to the DYNA 4 series only. It must be kept near the equipment in a readily and immediately accessible location at all times.

The content of this manual must be read, understood and followed in all points by all relevant people. This applies in particular to the notes on safety. Following the safety instructions will help to prevent accidents, defects and malfunctions.

DYNISCO will not be held liable for any injury, loss or damage resulting from failure to follow the instructions in this manual.

If malfunctions occur in spite of having followed the operating instructions, please contact the **DYNISCO** customer service department (see chapter 8, Maintenance).

This applies in particular during the warranty period.

1.2 Copyright

Copyright law requires that this manual be used for in-house purposes only.

All reproduction, even partially and for in-house purposes, requires the approval of **DYNISCO**. This manual may not be forwarded to third parties.



1.3 Explanation of icons

The manual uses icons to indicate information pertaining to safety:

ATTENTION Risk of destruction or damage to equipment, machines or installations



General danger to life or limb



Specific danger to life or limb



You **MUST** do this

The safety instructions are provided again in the individual chapters of the manual.

1.4 Abbreviations

The following abbreviations are used:

OM	Operating manual
PT	pressure transducer
f.s.	of full scale

1.5 Correct use

The purpose of the DYNA 4 pressure transducer is to measure pressure in plastic melt as part of a larger overall system. The DYNA 4 can be used in media temperatures up to 400°C.

If the PT is used in other applications, the safety and accident prevention regulations specific to that application must be followed.

When using the PT as a safety component in accordance with the EC Machine Directive, Annex IIc, the equipment manufacturer must take any necessary precautions to ensure that malfunctions of the PT cannot cause damage or injury.

1.6 User's obligations

The operator or owner of the larger overall system, e.g. a machine, is responsible for following the safety and accident prevention regulations that apply to the specific application.



2. Notes on safety



The operator or owner of the larger overall system is responsible for following the safety and accident prevention regulations that apply to the specific application.



Toxic hazard!

The PT contains a small amount (7 mm³) of mercury (Hg) as its transmission medium. If the diaphragm is damaged, mercury may escape.

Never transport or store the PT without the protective shell bolted in place. Remove the shell shortly before installation.

If mercury is inhaled or swallowed, seek medical attention immediately!

Mercury is hazardous waste and must be disposed of in accordance with applicable laws. **DYNISCO** will accept defective PTs.

If mercury escapes, use airtight packaging!



When planning machinery and using the PT, follow the safety and accident prevention regulations that apply to your application, e.g.:

- EN 60204, Electrical equipment in machines.
- EN 292, Machine safety, general design guidelines.
- DIN 57 100 Part 410, Protection against electric shock.



Mounting and electrical connection of the PT must be done by specialists with EMC training, following all applicable regulations, and in **pressureless, voltage-free** condition with the **machine switched off**.

The machine must be secured against being switched back on!



Burn hazard!

The PT must be removed with the melt in molten condition. The PT can be very hot when removed.



Wear protective gloves!

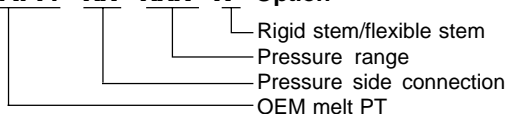


3. Technical Data

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3.1 Ordering guide

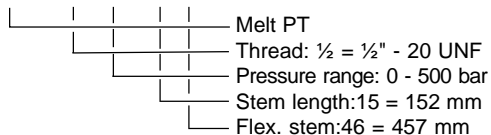
DYNA4 - xx - xxx - x - Option



The exact meanings of the letter/digit combinations are given in the corresponding sections of chapter 3.

3.2 Ordering example

DYNA4 - ½ - 5C - 15/46





3.3 Performance characteristics

3.3.1 Accuracy $\pm 0,5$ % of full scale
(Linearity and hysteresis at T = constant)

3.3.2 Repeatability $\pm 0,1$ % of full scale

3.3.3 Resolution infinite

3.4 Mechanical configurations

stem version or
rigid stem and flexible stem

3.5 Pressure side connection (DYNA4-XX-xxx-xx)

$\frac{1}{2}$ = $\frac{1}{2}$ " 20 UNF 2A

M18 = M18 x 1,5

3.6 Pressure ranges (DYNA4-xx-XXX-xx)

3.6.1 Pressure ranges in bar

Model number	Permitted pressure range in bar
DYNA4-xx-1C-xx	0 - 100
DYNA4-xx-2C-xx	0 - 200
DYNA4-xx-3,5C-xx	0 - 350
DYNA4-xx-5C-xx	0 - 500
DYNA4-xx-7C-xx	0 - 700
DYNA4-xx-1M-xx	0 - 1000
DYNA4-xx-1,4M-xx	0 - 1400
DYNA4-xx-2M-xx	0 - 2000

3.6.2 Max. Overload (without influencing operating data)

2 x full scale pressure up to 700 bar
(for 1000 bar and 1400 bar range: max. 1750 bar,
and 2450 bar for the 2000 bar range)

3.6.3 Burst pressure 6 x nominal value,
max. 3000 bar

3.6.4 Limit frequency 50 Hz [-3db]



3.7 Rigid stem/flexible stem (DYNA4-xx-xxx-XX)

15 = 152 mm standard length for rigid version
15/46 = 152 mm stem length / 457 mm flexible stem
Other lengths on request

3.8 Electrical data

Configuration	4-arm Wheatstone bridge strain gauge
Bridge resistance	350 $\Omega \pm 2\%$
Output signal	3,0 mV/V min.
Supply voltage	10 VDC (recommended) min. 6 VDC, max. 12 VDC
Calibration function (room temperature)	80 % $\pm 0,5\%$ of full scale output by externally connecting contacts E and F
Leakage resistance	> 1000 M Ω at 50 V

3.9 Temperature influence

Housing

Max. housing temperature +120 °C

Zero shift due to temperature change on melt head $\pm 0,2\%$ full scale / 10°C typ.

Diaphragm (in contact with media)

Maximum temperature at the diaphragm 400 °C

Zero shift due to temperature change on the diaphragm $\leq 0,2$ bar / 10 °C typ.

Sensitivity shift due to temperature change on the diaphragm $\leq 0,1\%$ f. s. / 10 °C typ.



3.10 EMC requirements

Conforming to **CE** in accordance with EMC directive.

Emitted interference	DIN EN 50081-1 (residential area)
Immunity	DIN EN 50082-2 (industrial area)

3.11 Materials

Diaphragm	15-5PH Mat.No. 1.4545 Armoloy coated
Stem	15-5PH Mat.No. 1.4545

3.12 Max. Mounting torque max. 50 Nm (500 inch-lbs.)
min. 12 Nm (100 inch-lbs.)

3.13 Environmental protection to IEC 529

PT housing	IP54 (without connector)
Standard connector	
PT06A-10-6S(SR)	IP40
Connector PT06W-10-6S	IP64

3.14 Weight 0,6 kg

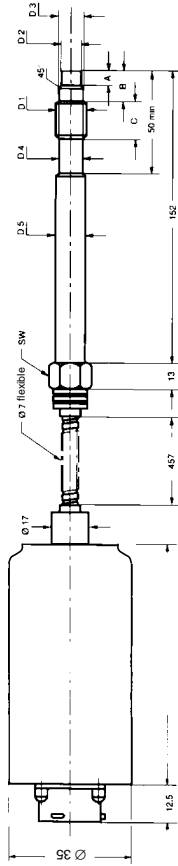


Fig. 02: DYNA 4
with flexible stem

D1	D2	D3	D4	D5	A	B	C	SW
1/2"-20UNF-2A M18 x 1,5	7,8 ^{-0,05} 10 ^{-0,05}	10,5 ^{+0,05} 16 ^{+0,1}	11 ^{-0,5} 16 ^{+0,5}	12,5 18	5,3 ^{+0,25} 6 ^{+0,25}	11 14	16 20	16 19



Operating manual



4. Function

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4.1 Construction

The PTs of series DYNA 4 are industry standard.

The main advantages are:

- manufactured under ISO 9002
- thermal stability
- resistance to aggressive media
- insensitivity to electromagnetic radiation (EMC)
- liquid-filled transmission system (mercury)
- pressure measurements in plastic melt up to a temperature of 400°C (750°F)
- maximum pressure 2000 bar

4.2 Description of functions

Through a closed, liquid-filled pressure transmission system, the PT furnishes an electrical signal that is proportional to the pressure of the melt.

The pressure applied by the medium is forwarded to the measuring diaphragm via the separating diaphragm and the mercury in the capillary. The deflection of the measuring diaphragm changes the resistance of the strain gauge bonded to the measuring diaphragm. The strain gauge is a Wheatstone bridge.

An electric signal proportional to the pressure is generated via the supply voltage.



5. Transport / delivery

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Toxic hazard!

The PT contains a small amount (7 mm³) of mercury (Hg) as its transmission medium. If the diaphragm is damaged, mercury may escape.

Never transport or store the PT without the protective shell bolted in place. Remove the shell shortly before installation.

If mercury is inhaled or swallowed, seek medical attention immediately.

Mercury is hazardous waste and must be disposed of in accordance with applicable laws. **DYNISCO** will accept defective PTs.

If mercury escapes, use airtight packaging!

ATTENTION ESD sensitive component. Electrostatic discharge may damage the PT. Take ESD precautions.

5.1 Transport/packing/transport damage

- Do not let the PT be damaged by other items during transit.
- Use only the original packaging.
- Report transport damage to **DYNISCO** immediately in writing.

5.2 Storage

- Store the PT in original packaging only.
- Protect against dust and moisture.

5.3 Scope of delivery

- PT with diaphragm protection cap
- Cable socket
- Fastening clip (transducer with flexible stem only)
- Calibration sheet
- Operating manual



6. Installation

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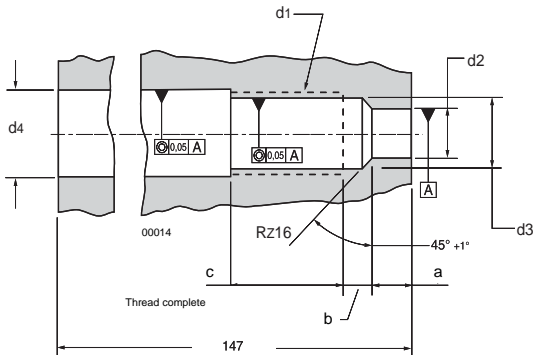
ATTENTION Ambient temperature for the housing
max. +120°C.
 Higher temperatures can result in damage
 and malfunctions. Mount the PT only in
 locations where these temperatures are
 not exceeded.

6.1 Mounting hole

ATTENTION To produce the mounting hole, use only
DYNISCO machining tool kit.

- Drill the mounting hole as shown in figure 06

Fig. 06: Mounting hole for transducer DYNA 4



d_1	d_2	d_3	d_4	a	b	c
1/2"-20UNF-2B	$7,92^{+0,05}$	$11,5^{+0,1}$	13	5,7	4	19
M18 x 1,5	$10,1^{+0,05}$	$16,1^{+0,1}$	20	6,15	4	25



When reworking the mounting hole, pay particular attention to the centricity of:

- the hole,
- the thread and
- the sealing surface.

Pressure sealing takes place on the 45° beveled sealing surface and on the front cylindrical section of the PT (see figures 06).

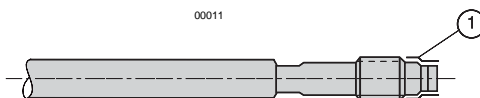
The sealing surface must be:

- correctly machined
- free from marks and rough edges
- free from solidified plastic residue.

6.2 Checking the mounting hole

- Paint the test bolt **DYNISCO** on the marked area (figure 07, item 1) with marking ink up to the thread.

Fig. 07: test bolt with marking ink



- Insert the test bolt in the mounting hole
- Twist it in by hand until the two sealing surfaces make contact.
- Remove and examine the test bolt.

The only acceptable abrasion of marking ink is at the sealing edge (45°), evenly (!) over the entire circumference.

If the ink has been rubbed off in other places too:

- rework the mounting hole.

6.3 Mounting the Pressure Transducer



Mounting and electrical connection of the PT must be done by specialists with EMC training, following all applicable regulations, and in **pressureless, voltage-free** condition with the **machine switched off**.

The machine must be secured against being switched back on!



Toxic hazard!

The PT contains a small amount (7 mm³) of mercury (Hg) as its transmission medium. If the diaphragm is damaged, mercury may escape.

Never transport or store the PT without the protective shell bolted in place. Remove the shell shortly before installation.

If mercury is inhaled or swallowed, seek medical attention immediately!

ATTENTION ESD sensitive component. Electrostatic discharge may damage the PT. Take ESD precautions.

ATTENTION Before mounting the PT, check the mounting hole carefully. The PT must only be mounted in holes that satisfy the requirements stipulated in chapter 6.1. A hole that does not satisfy these requirements can damage the PT.

ATTENTION Before mounting the PT, ensure that the mounting hole is free from plastic residue. Remove plastic residue with the **DYNISCO** cleaning tool kit. A test bolt is included with this cleaning set.

ATTENTION To prevent the PT from sticking permanently in the mounting hole, coat the thread section of the transducer with high temperature resistant grease or a suitable parting agent.

- Check the mounting hole with the test bolt, and clean with cleaning set if necessary.
- Coat the thread section of the transducer with high temperature resistant grease or a suitable parting agent.

ATTENTION Always use a spanner applied to the designated hexagon collar when screwing the PT in and out. Do not apply the tool to the housing or housing/sensor connection!

ATTENTION Maximum mounting torque **50 Nm**. If the mounting torque is too high, the PT may be damaged or its zero point may shift.

- screw the PT into the mounting hole and tighten.



6.4 Mounting PTs with flexible stem

Mounting a PT with a flexible stem to the pressure sensor is done analogously to the procedure in 6.3.

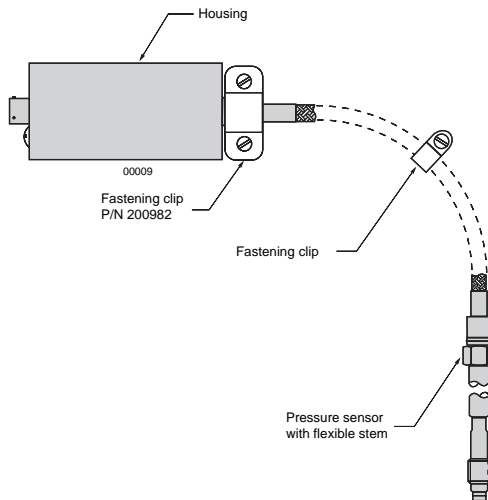
ATTENTION Avoid kinking or crushing the flexible stem.

Minimum bending radius
- **25 mm** for protected capillary

The connector must be easily accessible.

- Mount the housing of the PT with the fastening clip **DYNISCO** P/N 200982 (included). See mounting example in figure 08.
- Additionally secure the flexible stem between the housing with a standard cable clip.

Fig. 08: Mounting example for Pressure transducer with flexible stem





6.5 Electrical connection



Mounting and electrical connection of the PT must be done by specialists with EMC training, following all applicable regulations, and in **pressureless, voltage-free** condition with the **machine switched off**.

The machine must be secured against being switched back on!

ATTENTION ESD sensitive component. Electrostatic discharge may damage the PT. Take ESD precautions.

ATTENTION Avoid laying the power cable in the direct vicinity of cables carrying higher voltages or switching inductive or capacitive loads.

ATTENTION An EMC compliant power supply must be used. The electrical connection must comply with EMC requirements.

ATTENTION If the electrical connection is not made as described in chapter 6.5.1, or if cables / cable connectors / cable glands other than those stipulated by **DYNISCO** are used, **DYNISCO** cannot guarantee that EMC requirements will be satisfied.

6.5.1 EMC / CE compliant connection

- Earth the machine section with the screw-in trunnion / mounting hole for the PT in accordance with regulations. The PT must be connected to earth via the screw-in trunnion / mounting hole.
- Connect the shield of the connecting cable on both sides, making sure it conducts with full and continuous contact.
- When introducing the connecting cable into an EMC compliant switch cabinet, for example, connect the shield correctly (cable gland, conducting, full contact, continuous) to the conductive housing or route it via built-in cable connector that is also connected to the conductive housing.
- Connect unused cable cores or free cable ends correctly to the cable shield on both sides..

For order numbers of EMC compliant cable connectors required for connecting the PT, see chapter 9, Accessories.



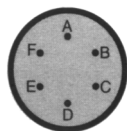
6.6 Connection assignments

Standard models DYNA 4:

Equipment connector: 6-pin male,
Bendix PT02A-10-6P

Cable socket: PT06A-10-6S(SR)

Fig. 09: 6-pin female connector



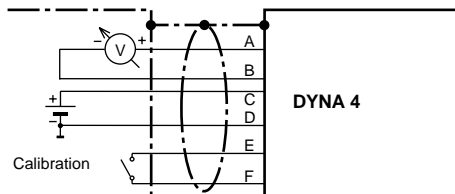
Top view solder side

PIN	Designation
A	signal (+)
B	signal (-)
C	supply voltage (+)
D	supply voltage (-)
E	calibration
F	calibration

The connector housing is connected conductively to the housing of the PT.

6.7 Wiring

Fig. 10: Wiring proposal 6-wire strain gauge





7. Commissioning

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ATTENTION Before putting the PT into operation, make sure the PT is securely mounted and sealed.

7.1 Supply voltage

DYNISCO recommends operating the pressure transducer with a supply voltage of 10 VDC. Supply voltages from 6 to 12 VDC are permitted.

ATTENTION Using a supply voltage which is different from that stated in the technical specifications or has reversed polarity can damage the PT or cause it to malfunction.

7.2 Calibration

PTs of series DYNA 4 have an internal calibration signal. Connecting terminals E and F switches the calibration signal to the signal output. It is 80% of the full scale pressure of the transducer.

ATTENTION Calibrate in pressureless state and at room temperature. Other ambient temperatures will corrupt the signal.

ATTENTION Do not change the installed position of the PT after calibration. If the position is changed you must re-calibrate the PT.

- Connect a meter or suitable display unit to the signal output.
- Set the display unit or external amplifier to pressureless state (zero point).
- Connect terminals E and F.
⇨ The calibration signal is connected to the output.
- Set the calibration value (80% of nominal pressure) on the display unit or external amplifier.
- Check the zero point setting on the display unit once again.



7.3 Zero adjustment

For PTs of series DYNA 4, adjust zero at operating temperature!

- Wait until a steady operating temperature is reached at the pressure sensor.
- Set the zero point on the display unit or external amplifier.

7.4 Operation

ATTENTION Before starting the machine, wait until the melt medium at the diaphragm of the PT has reached its operating/processing temperature. If the machine is started before the medium reaches its operating temperature, the PT will be damaged. If it is hard to tell when the operating temperature has been reached, use a combined TDA PT with thermocouple.

ATTENTION Operating temperature at the PT diaphragm **max. 400°C (750°F)**. Higher temperatures will damage the PT.

ATTENTION Ambient temperature for the housing **max. +120°C**. Higher temperatures can result in damage or malfunctions. Mount the PT only in locations where this temperature is not exceeded.



8. Maintenance

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8.1 Maintenance



Mounting and electrical connection of the PT must be done by specialists with EMC training, following all applicable regulations, and in **pressureless, voltage-free** condition with the **machine switched off**.

The machine must be secured against being switched back on!



Burn hazard!

The PT must be removed with the melt in molten condition. The PT can be very hot when removed.



Wear protective gloves!

ATTENTION ESD sensitive component. Electrostatic discharge may damage the PT. Take ESD precautions.

ATTENTION Always remove the PT before cleaning the machine with abrasives or steel wire brushes or suchlike.

ATTENTION Before removing the PT, the medium must be in molten condition.

ATTENTION Removing the transducer with the medium in solidified condition can damage the diaphragm of the PT.

ATTENTION Do not clean the screw-in section of the PT with hard objects. This will damage the PT!

ATTENTION Always use a spanner applied to the designated hexagon collar when screwing the PT in and out. Do not apply the tool to the housing or housing/sensor connection!

- Remove the PT.
- Carefully clean the diaphragm of the transducer with a soft cloth, while the medium is still malleable.



8.2 Repair/disposal



Toxic hazard!

The transmission medium in the PT is mercury (Hg). If the diaphragm is damaged, mercury may escape.

Never transport or store the PT without the protective shell bolted in place.

Remove the shell shortly before installation.

If mercury is inhaled or swallowed, seek medical attention immediately!

Mercury is hazardous waste and must be disposed of in accordance with applicable laws. **DYNISCO** will accept defective PTs.

If mercury escapes, use airtight packaging!

Please send defective PTs to your **DYNISCO** representative.

For addresses, see the back cover of the operating manual.

9. Accessories

- Machining tool kit ½"-20UNF-2A P/N
8BRD0004
- Machining tool kit M18 x 1,5 P/N
8BRD0005
- Cleaning tool kit ½"-20UNF-2A P/N
8BRD0009
- Cleaning tool kit M18 x 1,5 P/N
8BRD0006
- Pressure sensor simulator
- Pressure sensor calibrating device

Connectors, Cable glands, Cable

Designation	Order No.
Female connector DIN 7-pin	E311 0035
Female connector Bendix	E311 0029
Cable gland PG 7 CE	E447 0037
Connecting cable VT 460 - 6 meter	9VT0 0017
Connecting cable VT 460 - 10 meter	9VT0 0018



10. Troubleshooting

10.1 Troubleshooting

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10.1 Troubleshooting

Fault	Possible cause	Resolution
No signal	Cable breakage or poor contact	Check cable and contact, or replace
	No supply voltage	Check supply voltage
Strong zero shift when screwing in	Mounting hole incorrectly produced (alignment error)	Check hole with test bolt (chapter 6.2), rework with tool if necessary
	Mounting torque too high	Adjust to max. 50 Nm mounting torque
No signal change despite pressure rise	Plug forming in front of diaphragm	Check mounting hole; remove solidified plastic
	Diaphragm damaged	Send pressure transducer to DYNISCO for repair



11. CE - Declaration of conformity



Konformitätserklärung

Declaration of conformity
Déclaration de conformité
Declaración de conformidad
Declaração de conformidade

Hiermit erklären wir, daß unser Produkt, Typ:
We hereby declare that our product, type:
Nous déclarons par la présente que notre produit, type:
Por la presente declaramos que nuestro producto, tipo:
Com a presente, declaramos que o nosso produto, tipo:
Con la presente dichiariamo che il nostro prodotto tipo:
Hiermee verklaart wij dat ons product, type:
Hermed erklærer vi, at vores produkt af typen:
Με την παρούσα δηλώνουμε, ότι το προϊόν μας τύπου:

folgenden einschlägigen Bestimmungen entspricht:
complies with the following relevant provisions:
correspond aux dispositions pertinentes suivantes:
satisface las disposiciones pertinentes siguientes:
está en conformidad con as disposições pertinentes,
a saber:
è conforme alle seguenti disposizioni pertinenti:
voldoet aan de eisen van de in het vervolg genoemde bepalingen:
overholder følgende relevante bestemmelser:
αποτεκρίνεται στους ακόλουθους σχετικούς κανονισμούς:

Angewendete harmonisierte Normen, insbesondere:
Applied harmonized standards, in particular:
Normes harmonisées utilisées, notamment:
Normas armonizadas utilizadas particularmente:
Normas harmonizadas utilizadas, em particular:
Norme armonizzate applicate in particolare:
Gebruikte geharmoniseerde normen, in het bijzonder:
Anvendte harmoniserede normer, især:
Εφαρμοσθέντα εναρμονισμένα πρότυπα, ειδικότερα:

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Dichiarazione di conformità
Verklaring van overeenstemming
Konformitetserklæring
Αήλωστη συμμόρφωση EOK

Drucktransmitter / Druckaufnehmer
Pressure Transmitter / Pressure Transducer
Serie MDT, EMT, EIT, MDA, IDA, TDA, LDA,
PT, Dyna4

EMV-Richtlinie (89/336/EWG, 93/68/EWG, 93/44/EWG)
EMC guidelines (89/336/EEC, 93/68/EEC, 93/44/EEC)
Directive EMV (89/336/CEE, 93/68/CEE, 93/44/CEE)
Reglamento de compatibilidad electromagnética (89/336/MCE, 93/68/MCE, 93/44/MCE)
Directivă relativă la compatibilitate electro-magnetică (89/336/EWG, 93/68/EWG, 93/44/EWG)
Direttiva sulla compatibilità elettromagnetica (89/336/CEE, 93/68/CEE, 93/44/CEE)
EMV-richtlijn (89/336/EEG, 93/68/EEG, 93/44/EEG)
Direktiv om elektromagnetisk forligelighed (89/336/EØF, 93/68/EØF, 93/44/EØF)
κατευθυντήρια οδηγία περί ηλεκτρομαγνητικής συμβατότητας (89/336/EWG, 93/68/EWG, και 93/44/EWG)

EN 50081-1 / EN 50082-2

Heilbronn, den 1. Mai 1996

Daniel Nigg, Geschäftsführer

Operating manual



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in the world wide web:

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Technische Änderungen vorbehalten
Technical subject to change
Sous réserve de modifications techniques
Con riserva di modifiche tecniche

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