

Melt pressure transducers and transmitters

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Sensors

Melt pressure transducers and transmitters



GEFRAN

Our Know how,
Your Solution.

Melt pressure transducers and transmitters

GEFRAN Melt sensors are pressure/temperature transducers and transmitters designed to be used in environments that reach very high temperatures and are able to measure media pressure up to 538°C.

Based on two main constructive technologies (with filling fluid - extensimetric technology, and fluid free – silicon piezoresistive technology), Gefran high temperature pressure sensors are available in 4 different designs: rigid rod, flexible sheath, flexible with thermocouple, and exposed tip.

Because they are highly immune to noise, these Melt pressure sensors can be installed in every work environment to reduce electromagnetic noise in the field.

The devices ensure wide coverage of measurable pressures, from minimum range with scale 0-17 bar up to 0-3000 bar.

Output signals are mV/V, 4-20mA, 0-10V, Gauge, and CANOpen. Atex and Factory Mutual versions or version with Performance Level C complete the range for architectures and applications used on plastic transformation machines.



Filled pressure sensor: extensimetric technology

The M/W/K/MJ series are in the filled sensor family.

The entire structure is designed and built to transfer media pressure to the transduction part and keep it away from the heat source.

The hydraulic circuit is composed of a tip with 0.1 mm internal diameter; at the end of which the contact diaphragm and extensimetric diaphragm are welded.

Inside the sensor, the filling fluid with low compression coefficient (mercury, FDA-approved oil, NaK) transfers the stress.

The diaphragms are designed based on the pressures to be measured: the measurement diaphragm must deform very precisely based on the pressure exerted on the diaphragm in contact with the media.

The measurement element (extensimeter), which converts the physical pressure increase into an electrical signal, is located on the measurement diaphragm.

An extensimeter, the sensitive element of the sensor, consists of a thin metal wire bent and immersed in a flexible insulating material. This element is produced in Gefran plants to ensure the high quality of the devices.





Fluid-free pressure sensor: IMPACT technology

Series I (IMPACT) Melt sensors employ the piezoresistive principle: the pressure medium is converted into an electrical signal by a Wheatstone bridge built with 4 piezoresistors.

The innovative IMPACT technology is patented by Gefran and is made up of 3 elements:

The Chip:

- is the "sensing" element that converts pressure into an electrical signal
- consists of a single micro-machined silicon structure on which piezoresistors are inserted to form a Wheatstone bridge
- the basic material and technological process of the chip guarantee use of the device up to 350°C



The package:

- guarantees mechanical transfer of the pressure to the chip without the use of transmission fluids
- has been optimized to make the sensor stronger and more reliable (all parts in contact with the process and therefore subject to wear are up to 35 times stronger than traditional sensors)
- the modular structure is designed to resist dynamic pressures of up to 3500 bar
- the absence of filling fluids ensures rapid response and total compatibility with RoHS standards.



The complete sensor:

- conversion of the pressure into an electrical signal very close to the process permits a sensor with modular structure that makes the device easy to install and lets the user remote the electronics to the most practical location

Extrusion - Blowing: safety and performance

The Melt sensor is ideal for use in the production and transformation of polymers.

The M/W/K/I series, installed in extruders, monitor and control the main process phases.

Melt sensors are indispensable in extrusion processes because they:

- increase plant safety thanks to their use in preventing pressure increases in the machine
- increase output thanks to their ability to keep the flow-rate stable and optimum.

Melt sensors are normally used to read pressure

- **along the cylinder** to check performance when designing and developing the screw
- **during filter change** to check cleaning
- **before and after the gear pump** to keep the flow rate constant
- **in the head** for close-loop pressure control.

The I series is the ideal solution for all applications subject to large fluctuations of the process pressure.



Injection: precision and reading of dynamic pressures

For the injection process, Gefran offer the IJ series, designed to resist critical conditions such as vibrations and dynamic pressures.

These Melt pressure sensors are built with Impact technology, able to read dynamic pressures up to 3500 bar at working temperatures up to 350°C.

The IJ series can be installed

- in the injection nozzle,
- in hot runners,
- in external injection units.

The reduced dimensions, the high robustness, the autocompensation and the new self learning function, the modularity and the full compatibility with all the industrial processes (Fluid Free technology), allow the IJ series to be an exclusive sensor on the market.

Why choose GEFRAN

Mercury-free solutions

Concerned about environmental problems and in agreement with the RoHS directive, GEFRAN offers a wide range of "mercury-free" sensors:

- W series, with FDA-approved filling oil
- K series, with NaK filling, declared GRAS
- I series, completely fluid free

GTP

The new GTP coating, the result of Gefran research, ensures longer life for Gefran Melt sensors. Principal characteristics include:

- low coefficient of friction
- high hardness
- high resistance to high temperatures
- high resistance to chemical attack

Autozero

All Gefran amplified Melt pressure sensors in the M/W/K/I series have the **Autozero** function, which eliminates signal variations linked to a thermal effect before pressurizing the system.

Autocompensation

With the SP option (internal autocompensation), M/W/K series transmitters cancel the pressure signal variation effect caused by variation of the Melt temperature.

In this way, the read error caused by heating of the filling fluid (typical in filled sensors) is reduced to a minimum.

The new digital electronics allows the Impact technology to compensate automatically the thermal drift.

Atex and Factory Mutual Certifications

Only those electronic devices that conform to a precise safety requisite may be used in zones with a risk of explosion. Under no circumstances may these devices cause an explosion.

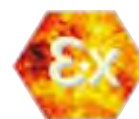
Gefran MX, WX or IX (Atex) and MF or WF (Factory mutual) transmitters and transducers are certified in compliance with their respective protection and safety requisites.

Performance Level

The Impact series complies with the safety requisites issued in the recent Machinery Directive 2006/42/CE and EN1114, specific for extruders; the new Performance Level C version conforms to EN 13849-1.

This version has intelligent electronics with Auto Diagnostics that detects all possible fault conditions.

Safety levels on this Impact PLC version are increased by a relay integrated in the electronics that changes state in case of overpressures or if the set limit is exceeded, and by conformity to Namur NE21 and NE43 recommendations.








GUIDE TO CODE







The code identifying the various models of GEFRAN Melt sensors has three sections, with the following meanings.

example: ME2 - Melt sensor with mercury filling fluid, 4-20 mA output in current with flexible rod plus thermocouple



M		E		2	
M	Mercury	3	3.33 mV/V non-amplified output	0	rigid rod
W	FDA oil	2	2.5 mV/V non-amplified output	1	flexible sheath
K	Nak	E	4-20mA output in current	2	flexible rod plus thermocouple
I	Impact	N	0-10V output in voltage	3	exposed tips
IJ	Injection application, Impact	D	CAN-BUS DP404 digital output DP404		
MJ	Injection application, mercury	5	output: extensimeter, analog display		
		6	output: extensimeter, digital display		
		X	Atex, Intrinsic Safety		
		F	Factory Mutual Explosion proof		

									<i>New!</i> 
M	mercury	X	X	X	X	X			
W	FDA oil	X	X	X	X	X	X		
K	Nak	X	X	X			X		
I	Impact	X	X	X	X		X	X	X

	<div><div><div><div>M30M31</div></div><div><div>M32M33</div></div></div><div><div><div><div>W30W31</div></div><div><div>W32W33</div></div></div><div><div><div><div>K30K31</div></div><div><div>K32K33</div></div></div></div></div></div>					
Output mv/V						
FILLING FLUID	mercury		diathermic oil (FDA approved)		sodium-potassium	
PRECISION CLASS (%FSO)	H 0,25%	M 0,50%	H 0,25%	M 0,50%	H 0,25%	M 0,50%
PRESSURE RANGE (bar)	0...35 to 0...2000bar 0...500 to 0...30000psi		0...35 to 0...1000bar 0...500 to 0...15000psi		0...35 to 0...1000bar 0...500 to 0...15000psi	
SUPPLY VOLTAGE (Vdc)	6...12Vdc[10Vdc typical]		6...12Vdc[10Vdc typical]		6...12Vdc[10Vdc typical]	
SIGNAL AT RATED PRESSURE	2.5 mV/V (option 2) 3.33mV/V (option 3)		2.5 mV/V (option 2) 3.33mV/V (option 3)		2.5 mV/V (option 2) 3.33mV/V (option 3)	
SIGNAL AT AMBIENT PRESSURE	±5% F.S.O.		±5% F.S.O.		±5% F.S.O.	
AMBIENT COMPENSATED TEMPERATURE RANGE (°C)(°F)	0...+100°C 32...212°F		0...+100°C 32...212°F		0...+100°C 32...212°F	
PERMITTED AMBIENT TEMPERATURE RANGE (°C)(°F)	-30...+120°C -22...250°C		-30...+120°C -22...250°C		-30...+120°C -22...250°C	
TEMPERATURE RANGE OF MEASUREMENT FLUID (°C)(°F)	400°C 750°F		315°C 600°F		0...+538°C 32...1000°F	
ZERO THERMAL DRIFT DUE TO VARIATION OF MEASUREMENT FLUID TEMPERATURE (bar/10°C)	0.02 bar/°C 15 psi/100°F		0.04 bar/°C 30 psi/100°F		<3.5 bar/100°C <51 psi/212°F	
PROTECTION DEGREE (IEC-529)	IP65		IP65		IP65	
TEMPERATURE SENSOR	Version M32 (Thermocouple type "J" isolated junction)		Version W32 (Thermocouple type "J" isolated junction)		Version K32 (Thermocouple type "J" isolated junction)	
MATERIAL IN CONTACT WITH PROCESS MEDIUM	15-5PH stainless steel with GTP coating 17-7 PH corrugated diaphragm with GTP coating for ranges < 100 bar (1500 psi)		17-7 PH corrugated diaphragm with GTP coating		15-5PH stainless steel with GTP coating 17-7 PH corrugated diaphragm with GTP coating for ranges < 100 bar (1500 psi) Up to 538°C Inconel with GTP coating	
ELECTRICAL CONNECTIONS	conn. 6 pin VPT07RA10-6PT (PT02A-10-6P) conn. 8 pin PC02E-12-8P		conn. 6 pin VPT07RA10-6PT (PT02A-10-6P) conn. 8 pin PC02E-12-8P		conn. 6 pin VPT07RA10-6PT (PT02A-10-6P) conn. 8 pin PC02E-12-8P	
PROCESS CONNECTIONS	1/2 - 20 UNF M14 x 1.5 M18 x 1.5 M10 x 1		1/2 - 20 UNF M18 x 1.5		1/2 - 20 UNF M18 x 1.5	
MECHANICS	M30 series – Rigid rod M31 series – Flex sheathing M32 series – flex + thermos. *M33 series – exposed capillary		W30 series – Rigid rod W31 series – Flex sheathing W32 series – flex + thermos. *W33 series – exposed capillary		K30 series – Rigid rod K31 series – Flex sheathing K32 series – flex + thermos. *K33 series – exposed capillary	
OPTIONS	Rod and diaphragm in Hastelloy C276 Diaphragms coated with special coatings		Diaphragms coated with special coatings		Rod and diaphragm in Hastelloy C276 Diaphragms coated with special coatings	
MAIN APPLICATIONS	Extrusion of plastics Extrusion of fiber		Extrusion of plastics Mercury-free applications		Extrusion of plastics Mercury-free applications HT polymer processing	
	* Available only in 1/2 - 20 UNF version					

EXTRUSION

Output mA

FILLING FLUID

PRECISION CLASS (%FSO)

PRESSURE RANGE (bar)

SUPPLY VOLTAGE (Vdc)

SIGNAL AT RATED PRESSURE

SIGNAL AT AMBIENT PRESSURE

AMBIENT COMPENSATED TEMPERATURE RANGE (°C)(°F)

PERMITTED AMBIENT TEMPERATURE RANGE (°C)(°F)

TEMPERATURE RANGE OF MEASUREMENT FLUID (°C)(°F)

ZERO THERMAL DRIFT DUE TO VARIATION OF MEASUREMENT FLUID TEMPERATURE (bar/10°C)

PROTECTION DEGREE (IEC-529)

TEMPERATURE SENSOR

MATERIAL IN CONTACT WITH PROCESS MEDIUM

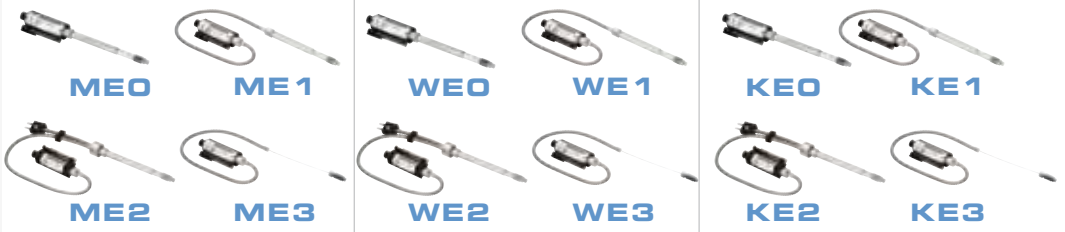
ELECTRICAL CONNECTIONS

PROCESS CONNECTIONS

MECHANICS

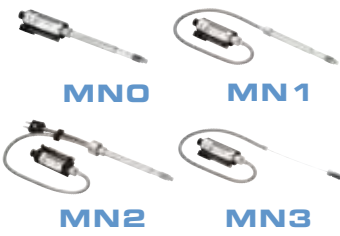


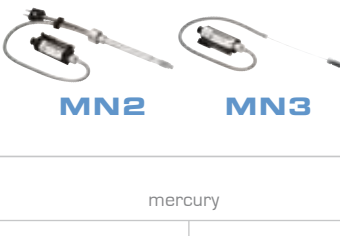

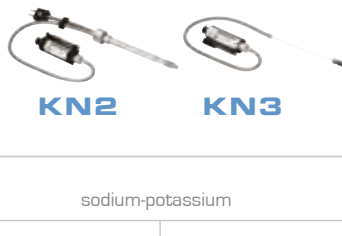
OPTIONS

MAIN APPLICATIONS









	mercury		diathermic oil (FDA approved)		sodium-potassium	
	H 0,25%	M 0,5%	H 0,25%	M 0,5%	H 0,25%	M 0,5%
	0...35 to 0...2000bar 0...500 to 0...30000psi		0...35 to 0...1000bar 0...500 to 0...15000psi		0...35 to 0...1000bar 0...500 to 0...15000psi	
	10...30Vdc		10...30Vdc		10...30Vdc	
	20mA		20mA		20mA	
	4mA		4mA		4mA	
	0...+85°C		0...+85°C		0...+85°C	
	-30...+105°C		-30...+105°C		-30...+105°C	
	400°C 750°F		315°C 600°F		0...538°C 32...1000°F	
	0.02 bar/°C 15 psi/100°F		0.04 bar/°C 30 psi/100°F		<3.5 bar/100°C <51 psi/212°F	
	IP65		IP65		IP65	
	Version ME2 (Thermocouple type "J" isolated junction)		Version WE2 (Thermocouple type "J" isolated junction)		Version KE2 (Thermocouple type "J" isolated junction)	
	15-5PH stainless steel with GTP coating 17-7 PH corrugated diaphragm with GTP coating for ranges < 100 bar (1500 psi)		17-7 PH corrugated diaphragm with GTP coating		15-5PH stainless steel with GTP coating 17-7 PH corrugated diaphragm with GTP coating for ranges < 100 bar (1500 psi) Up to 538°C Inconel with GTP coating	
	conn. 6 pin VPT07RA10-6PT (PT02A-10-6P) conn. 8 pin PC02E-12-8P		conn. 6 pin VPT07RA10-6PT (PT02A-10-6P) conn. 8 pin PC02E-12-8P		conn. 6 pin VPT07RA10-6PT (PT02A-10-6P) conn. 8 pin PC02E-12-8P	
	1/2 - 20 UNF M14 x 1.5 M18 x 1.5 M10 x 1		1/2 - 20 UNF M18 x 1.5		1/2 - 20 UNF M18 x 1.5	
	MEO series – Rigid rod ME1 series – Flex sheathing ME2 series – flex + thermos. *ME3 series – exposed capillary		WEO series – Rigid rod WE1 series – Flex sheathing WE2 series – flex + thermos. *WE3 series – exposed capillary		KEO series – Rigid rod KE1 series – Flex sheathing KE2 series – flex + thermos. *KE3 series – exposed capillary	
	Rod and diaphragm in Hastelloy C276 Diaphragms coated with special coatings		Other diaphragm coatings		Rod and diaphragm in Hastelloy C276 Other diaphragm coatings	
	Extrusion of plastics Extrusion of fiber		Extrusion of plastics Mercury-free applications		Extrusion of plastics Mercury-free applications HT polymer processing	

* Available only in 1/2 - 20 UNF version






EXTRUSION	 MNO MN1		 WNO WN1		 KNO KN1	
	 MN2 MN3		 WN2 WN3		 KN2 KN3	
Output Volt						
FILLING FLUID	mercury		diathermic oil (FDA approved)		sodium-potassium	
PRECISION CLASS [%FSO]	H 0,25%	M 0,5%	H 0,25%	M 0,5%	H 0,25%	M 0,5%
PRESSURE RANGE (bar)	0...35 to 0...2000bar 0...500 to 0...30000psi		0...35 to 0...1000bar 0...500 to 0...15000psi		0...35 to 0...1000bar 0...500 to 0...15000psi	
SUPPLY VOLTAGE (Vdc)	15...30Vdc N,C 10...30Vdc B,M		15...30Vdc N,C 10...30Vdc B,M		15...30Vdc N,C 10...30Vdc B,M	
SIGNAL AT RATED PRESSURE	5Vdc (M,H) - 10Vdc (N,L) 5,1Vdc (B) 10,1Vdc (C)		5Vdc (M,H) - 10Vdc (N,L) 5,1Vdc (B) 10,1Vdc (C)		5Vdc (M) - 10Vdc (N) 5,1Vdc (B) 10,1Vdc (C)	
SIGNAL AT AMBIENT PRESSURE	0Vdc (M,N,H,L) 0,1Vdc (B,C)		0Vdc (M,N,H,L) 0,1Vdc (B,C)		0Vdc (M,N) 0,1Vdc (B,C)	
AMBIENT COMPENSATED TEMPERATURE RANGE (°C)(°F)	0...+85°C		0...+85°C		0...+85°C	
PERMITTED AMBIENT TEMPERATURE RANGE (°C)(°F)	-30...+105°C		-30...+105°C		-30...+105°C	
TEMPERATURE RANGE OF MEASUREMENT FLUID (°C)(°F)	400°C 750°F		315°C 600°F		0...+538°C 32...1000°F	
ZERO THERMAL DRIFT DUE TO VARIATION OF MEASUREMENT FLUID TEMPERATURE (bar/10°C)	0.02 bar/°C 15 psi/100°F		0.04 bar/°C 30 psi/100°F		<3.5 bar/100°C <51 psi/212°F	
PROTECTION DEGREE (IEC-529)	IP65		IP65		IP65	
TEMPERATURE SENSOR	MN2 Version (Thermocouple type "J" isolated junction)		WN2 Version (Thermocouple type "J" isolated junction)		KN2 Version (Thermocouple type "J" isolated junction)	
MATERIAL IN CONTACT WITH PROCESS MEDIUM	15-5PH stainless steel with GTP coating 17-7 PH corrugated diaphragm with GTP coating for ranges < 100 bar (1500 psi)		17-7 PH corrugated diaphragm with GTP coating		15-5PH stainless steel with GTP coating 17-7 PH corrugated diaphragm with GTP coating for ranges < 100 bar (1500 psi) Up to 538°C Inconel with GTP coating	
ELECTRICAL CONNECTIONS	conn. 6 pin VPT07RA10-6PT (PT02A-10-6P) conn. 8 pin PC02E-12-8P		conn. 6 pin VPT07RA10-6PT (PT02A-10-6P) conn. 8 pin PC02E-12-8P		conn. 6 pin VPT07RA10-6PT (PT02A-10-6P) conn. 8 pin PC02E-12-8P	
PROCESS CONNECTIONS	1/2 - 20 UNF M14 x 1.5 M18 x 1.5 M10 x 1		1/2 - 20 UNF M18 x 1.5		1/2 - 20 UNF M18 x 1.5	
MECHANICS	MNO series – Rigid rod MN1 series – Flex sheathing MN2 series – flex + thermos. * MN3 series – exposed capillary		WNO series – Rigid rod WN1 series – Flex sheathing WN2 series – flex + thermos. * WN3 series – exposed capillary		KNO series – Rigid rod KN1 series – Flex sheathing KN2 series – flex + thermos. * KN3 series – exposed capillary	
OPTIONS	Rod and diaphragm in Hastelloy C276 Diaphragms coated with special coatings		Other diaphragm coatings		Rod and diaphragm in Hastelloy C276 Other diaphragm coatings	
MAIN APPLICATIONS	Extrusion of plastics Extrusion of fiber		Extrusion of plastics Mercury-free applications		Extrusion of plastics Mercury-free applications HT polymer processing	
	* Available only in 1/2 - 20 UNF version					

EXTRUSION

Digital Output
CANopen

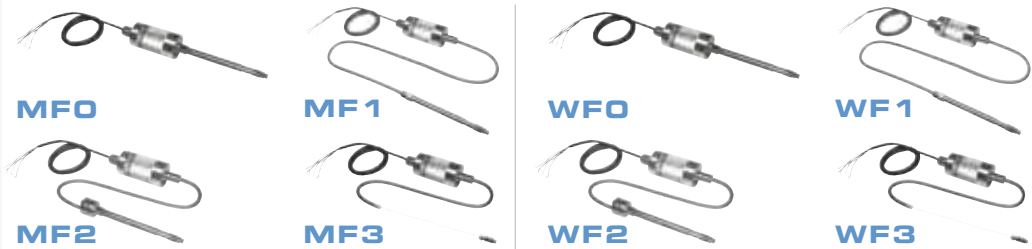
	 MD0 MD1		 WD0 WD1		 KD0 KD1	
	 MD2 MD3		 WD2 WD3		 KD2 KD3	
FILLING FLUID	mercury		diathermic oil (FDA approved)		sodium-potassium	
PRECISION CLASS [%FSO]	H 0,25%	M 0,5%	H 0,25%	M 0,5%	H 0,25%	M 0,5%
PRESSURE RANGE [bar]	0...35 to 0...2000bar 0...500 to 0...30000psi		0...35 to 0...1000bar 0...500 to 0...15000psi		0...35 to 0...1000bar 0...500 to 0...15000psi	
SUPPLY VOLTAGE [Vdc]	12...40Vdc		12...40Vdc		12...40Vdc	
POWER SUPPLY PROTOCOL	DP404 CAN OPEN, with baud rate selection from 10K to 1M baud (default 500K baud)		DP404 CAN OPEN, with baud rate selection from 10K to 1M baud (default 500K baud)		DP404 CAN OPEN, with baud rate selection from 10K to 1M baud (default 500K baud)	
STRAIN GAUGE HOUSING COMPENSATED TEMPERATURE RANGE	0...+76°C (32... 170°F)		0...+76°C (32... 170°F)		0...+76°C (32... 170°F)	
STRAIN GAUGE HOUSING MAXIMUM TEMPERATURE RANGE	-30...+85°C (-22... 185°F)		-30...+85°C (-22... 185°F)		-30...+85°C (-22... 185°F)	
TEMPERATURE RANGE OF MEASUREMENT FLUID (°C)(°F)	400°C 750°F		315°C 600°F		0...538°C 32...1000°F	
ZERO THERMAL DRIFT DUE TO VARIATION OF MEASUREMENT FLUID TEMPERATURE (bar/10°C)	0.02 bar/°C 15 psi/ 100°F		0.04 bar/°C 30 psi/ 100°F		<3.5 bar/ 100°C <51 psi/212°F	
PROTECTION DEGREE (IEC-529)	IP65		IP65		IP65	
TEMPERATURE SENSOR	MD2 Version (Thermocouple type "J" isolated junction)		WD2 Version (Thermocouple type "J" isolated junction)		KD2 Version (Thermocouple type "J" isolated junction)	
MATERIAL IN CONTACT WITH PROCESS MEDIUM	15-5PH stainless steel with GTP coating 17-7 PH corrugated diaphragm with GTP coating for ranges < 100 bar (1500 psi)		17-7 PH corrugated diaphragm with GTP coating		15-5PH stainless steel with GTP coating 17-7 PH corrugated diaphragm with GTP coating for ranges < 100 bar (1500 psi) Up to 538°C Inconel with GTP coating	
ELECTRICAL CONNECTIONS	conn. 5 pin M12, DIN EN50044		conn. 5 pin M12, DIN EN50044		conn. 5 pin M12, DIN EN50044	
PROCESS CONNECTIONS	1/2 - 20 UNF M14 x 1.5 M18 x 1.5 M10 x 1		1/2 - 20 UNF M18 x 1.5		1/2 - 20 UNF M18 x 1.5	
MECHANICS	MD0 series – Rigid rod MD1 series – Flex sheathing MD2 series – flex + thermos. *MD3 series – exposed capillary		WD0 series – Rigid rod WD1 series – Flex sheathing WD2 series – flex + thermos. *WD3 series – exposed capillary		KD0 series – Rigid rod KD1 series – Flex sheathing KD2 series – flex + thermos. *KD3 series – exposed capillary	
OPTIONS	Rod and diaphragm in Hastelloy C276 Diaphragms coated with special coatings		Other diaphragm coatings		Rod and diaphragm in Hastelloy C276 Other diaphragm coatings	
MAIN APPLICATIONS	Extrusion of plastics Extrusion of fiber		Extrusion of plastics Mercury-free applications		Extrusion of plastics Mercury-free applications HT polymer processing	

* Available only in 1/2 - 20 UNF version

EXTRUSION						
						
Hazardus Area						
FILLING FLUID	mercury		diathermic oil (FDA approved)		mercury	
PRECISION CLASS (%FSO)	H 0,25%	M 0,50%	H 0,25%	M 0,50%	H 0,25%	M 0,50%
PRESSURE RANGE (bar)	0...35 to 0...2000bar 0...500 to 0...30000psi		0...35 to 0...1000bar 0...500 to 0...15000psi		0...35 to 0...1000bar 0...500 to 0...15000psi	
SUPPLY VOLTAGE (Vdc)	12...30Vdc		12...30Vdc		12...30Vdc	
SIGNAL AT RATED PRESSURE	20mA		20mA		20mA	
SIGNAL AT AMBIENT PRESSURE	4mA		4mA		4mA	
AMBIENT COMPENSATED TEMPERATURE RANGE (°C)(°F)	-20...+70°C -4...+158°F		-20...+70°C -4...+158°F		-20...+70°C -4...+158°F	
PERMITTED AMBIENT TEMPERATURE RANGE (°C)(°F)	See Safety Mode		See Safety Mode		See Safety Mode	
TEMPERATURE RANGE OF MEASUREMENT FLUID (°C)(°F)	400°C 750°F		315°C 600°F		400°C 750°F	
ZERO THERMAL DRIFT DUE TO VARIATION OF MEASUREMENT FLUID TEMPERATURE (bar/10°C)	0.02 bar/°C 15 psi/ 100°F		0.04 bar/°C 30 psi/ 100°F		0.02 bar/°C 15 psi/ 100°F	
PROTECTION DEGREE (IEC-529)	IP65		IP65		IP65	
TEMPERATURE SENSOR	Version MX2 (Thermocouple type "J" isolated junction)		Version WX2 (Thermocouple type "J" isolated junction)			
PROTECTION MODE	EEx ia IIC T5,T4 ambient temperature 20...+55°C/+60°C/+70°C		EEx ia IIC T5,T4 ambient temperature 20...+55°C/+60°C/+70°C		EEx ia IIC T5,T4 ambient temperature 20...+55°C/+60°C/+70°C	
MATERIAL IN CONTACT WITH PROCESS MEDIUM	15-5 PH stainless steel with GTP coating 17-7 PH corrugated diaphragm with GTP coating for ranges <100bar (1500psi)		17-7 PH corrugated diaphragm with GTP coating		15-5 PH stainless steel with GTP coating 17-7 PH corrugated diaphragm with GTP coating for ranges <100bar (1500psi)	
ELECTRICAL CONNECTIONS	conn. 6 pin VPT07RA10-6PT (PT02A-10-6P) conn. 8 pin PC02E-12-8P		conn. 6 pin VPT07RA10-6PT (PT02A-10-6P) conn. 8 pin PC02E-12-8P		conn. 6 pin VPT07RA10-6PT (PT02A-10-6P) conn. 8 pin PC02E-12-8P	
PROCESS CONNECTIONS	1/2 - 20 UNF M14 x 1.5 M18 x 1.5 M10 x 1		1/2 - 20 UNF M18 x 1.5		Flange	
MECHANICS	MX0 series – Rigid rod MX1 series – Flex sheathing MX2 series – flex + thermos. *MX3 series – exposed capillary		WX0 series – Rigid rod WX1 series – Flex sheathing WX2 series – flex + thermos. *WX3 series – exposed capillary		MX4 series - flange	
OPTIONS	Rod and diaphragm in Hastelloy C276 Other diaphragm coatings		Other diaphragm coatings		Other diaphragm coatings	
MAIN APPLICATIONS	Extrusion of plastics Extrusion of fiber		Extrusion of plastics Mercury-free applications		Extrusion of plastics Extrusion of fiber	

EXTRUSION

Hazardus Area



FILLING FLUID

PRECISION CLASS [%FSO]

PRESSURE RANGE [bar]

SUPPLY VOLTAGE [Vdc]

SIGNAL AT RATED PRESSURE

SIGNAL AT AMBIENT PRESSURE

AMBIENT COMPENSATED TEMPERATURE RANGE [°C][°F]

PERMITTED AMBIENT TEMPERATURE RANGE [°C][°F]

TEMPERATURE RANGE OF MEASUREMENT FLUID [°C][°F]

ZERO THERMAL DRIFT DUE TO VARIATION OF MEASUREMENT FLUID TEMPERATURE [bar/10°C]

PROTECTION DEGREE [IEC-529]

PROTECTION MODE

MATERIAL IN CONTACT WITH PROCESS MEDIUM

ELECTRICAL CONNECTIONS

PROCESS CONNECTIONS

MECHANICS

OPTIONS

MAIN APPLICATIONS

mercury		diathermic oil [FDA approved]	
H 0,25%	M 0,5%	H 0,25%	M 0,5%
0...35 to 0...2000bar 0...500 to 0...30000psi		0...35 to 0...1000bar 0...500 to 0...15000psi	
12...30Vdc (24Vdc rec.)		12...30Vdc (24Vdc rec.)	
20mA		20mA	
4mA		4mA	
0°C to 76°C (32°F to 170°F)		0°C to 76°C (32°F to 170°F)	
-30...85°C (-22...185°F)		-30...85°C (-22...185°F)	
400°C 750°F		315°C 600°F	
0.02 bar/°C 15 psi/100°F		0.04 bar/°C 30 psi/100°F	
IP65		IP65	
Explosionproof for Class I, Division1, Groups A,B,C,D and dust Ignitionproof for Class II, Division 1, Group E,FG		Explosionproof for Class I, Division1, Groups A,B,C,D and dust Ignitionproof for Class II, Division 1, Group E,FG	
15-5 PH stainless steel with GTP coating 17-7 PH corrugated diaphragm with GTP coating for ranges <100bar (1500psi)		17-7 PH corrugated diaphragm with GTP coating for ranges <100bar (1500psi)	
Cable (type NPT)		Cable (type NPT))	
1/2 - 20 UNF M14 x 1.5 M18 x 1.5 M10 x 1		1/2 - 20 UNF M18 x 1.5	
MFO series – Rigid rod MF1 series – Flex sheathing MF2 series – flex + thermos. *MF3 series – exposed capillary		WFO series – Rigid rod WF1 series – Flex sheathing WF2 series – flex + thermos. *WF3 series – exposed capillary	
Rod and diaphragm in Hastelloy Diaphragm coated with special coatings		Other diaphragm coatings	
Extrusion of plastics Extrusion of fiber		Extrusion of plastics Mercury-free applications	

Extensimetric pressure transmitters for high temperature

EXTRUSION

Digital indication



NOMINAL ACCURACY INCLUDING LINEARITY, REPEATABILITY, HYSTERESIS

M > ±0.50% FSO

M > ±0.50% FSO

MEASUREMENT RANGE (bar)

0...35 a 0...1000bar
0...500 a 0...15000psi

0...35 a 0...1000bar
0...500 a 0...15000psi

SUPPLY VOLTAGE (Vdc)

115 VAC o 230VAC (factory set)

115 VAC o 230VAC (factory set)

RETRANSMISSION OF PRESSURE VALUE

4-20 mA (650Ω max.load)

4-20 mA (650Ω max.load)

MAXIMUM HOUSING TEMPERATURE

55°C (130°F)

55°C (130°F)

THERMAL DRIFT IN COMPENSATED RANGE

Zero
Sensitivity

4.0%/100°C (2.0%/100°F)
2.0%/100°C (1.0%/100°F)

4.0%/100°C (2.0%/100°F)
2.0%/100°C (1.0%/100°F)

MAXIMUM DIAPHRAGM TEMPERATURE

400°C (750°F)

315°C (600°F)

ZERO DRIFT DUE TO CHANGE IN PROCESS TEMPERATURE

0.02 bar/°C
(15 psi/100°F)

0.04 bar/°C
(30 psi/100°F)

MATERIAL IN CONTACT WITH PROCESS MEDIUM

Standard
70bar
(1000psi)

15-5 PH SS (GTP coated)
Corrugated 17-7 PH SS
(GTP coated)

Corrugated 17-7 PH SS
(GTP coated)

THERMOCOUPLE (M62-W62 MODEL)

Type "J" (isolated junction)

Type "J" (isolated junction)

RETRANSMISSION

4-20mA

4-20mA

EXTRUSION

Analog indication



M50



M51



M52

NOMINAL ACCURACY INCLUDING LINEARITY, REPEATABILITY, HYSTERESIS

L < ±1% FSD

L < ±1% FSD

L < ±1% FSD

MEASUREMENT RANGE (bar)

0...350 to 0...700bar
0...5000 to 0...10000psi

0...350 to 0...700bar
0...5000 to 0...10000psi

0...350 to 0...700bar
0...5000 to 0...10000psi

MAXIMUM OVERPRESSURE

1.5 x FSD

1.5 x FSD

1.5 x FSD

MEASUREMENT PRINCIPLE

Bourdon tube

Bourdon tube

Bourdon tube

HOUSING TEMPERATURE RANGE

-30...85°C (-22...185°F)

-30...85°C (-22...185°F)

-30...85°C (-22...185°F)

MAXIMUM DIAPHRAGM TEMPERATURE

400°C (750°F)

400°C (750°F)

400°C (750°F)

ZERO DRIFT DUE TO CHANGE IN PROCESS TEMPERATURE

0.02 bar/°C
(15 psi/100°F)

0.02 bar/°C
(15 psi/100°F)

0.02 bar/°C
(15 psi/100°F)

MATERIAL IN CONTACT WITH PROCESS MEDIUM

Standard

15-5 PH SS (GTP coated)

15-5 PH SS (GTP coated)

15-5 PH SS (GTP coated)

THERMOCOUPLE (M62-W62 MODEL)

Type "J" (isolated junction)

Type "J" (isolated junction)

Type "J" (isolated junction)

Extensimetric pressure indicators for high temperature

EXTRUSION / INJECTION-BLOW MOULDING



IE1
Current output



IN1
Voltage output



I3
mV/V output

ACCURACY CLASS [%FSO]	H 0,25%	M 0,5%	H 0,25%	M 0,5%	H 0,25%	M 0,5%
MEASUREMENT RANGE (bar)	0...100 to 0...1000bar 0...1500 to 0...15000psi		0...35 to 0...1000bar 0...500 to 0...15000psi		0...35 to 0...1000bar 0...500 to 0...15000psi	
POWER SUPPLY (Vdc)	10...30Vdc N,C		15...30Vdc		8...12Vdc	
SIGNAL AT RATED PRESSURE	20mA		5Vdc (M) - 10Vdc (N) 5,1Vdc (B,C) - 10,1Vdc (C)		2,5mV/V (2) 3,33mV/V (3)	
SIGNAL AT AMBIENT PRESSURE	4mA		0Vdc (M,N) 0,1Vdc (B,C)		0mV/V	
AMBIENT COMPENSATED TEMPERATURE RANGE	0...+85°C		0...+85°C		0...+85°C	
PERMITTED AMBIENT TEMPERATURE RANGE	-30...+105°C		-30...+105°C		-30...+105°C	
MAXIMUM DIAPHRAGM TEMPERATURE (°C)[°F]	350°C 660°F		350°C 660°F		350°C 660°F	
ZERO THERMAL DRIFT DUE TO VARIATION OF MEASUREMENT OF PROCESS OF RANGE 20-350°C	< ± 1,2 %FSO		< ± 1,2 %FSO		< ± 1,2 %FSO	
FULL SCALE SIGNAL VARIATION DUE TO PROCESS TEMPERATURE VARIATION IN RANGE 20-350°C	< ± 1 %FSO		< ± 1 %FSO		< ± 1 %FSO	
MATERIAL IN CONTACT WITH PROCESS MEDIUM	15-5 PH GTP coated		15-5 PH GTP coated		15-5 PH GTP coated	
PROTECTION DEGREE	IP65		IP65		IP65	
ELECTRICAL CONNECTIONS	conn. 6 pin VPT07RA10-6PT (PT02A-10-6P) conn. 8 pin PC02E-12-8P		conn. 6 pin VPT07RA10-6PT (PT02A-10-6P) conn. 8 pin PC02E-12-8P		conn. 6 pin VPT07RA10-6PT (PT02A-10-6P) conn. 8 pin PC02E-12-8P	
PROCESS CONNECTIONS	1/2 - 20 UNF M18 x 1,5		1/2 - 20 UNF M18 x 1,5		1/2 - 20 UNF M18 x 1,5	
MECHANICS	Flex sheathing		Flex sheathing		Flex sheathing	
MAIN APPLICATIONS	Extrusion of plastics Food and Pharmaceutical applications Mercury-free applications Abrasive polymers (fiber glass/recycling) Dynamic pressure Injection-Blow moulding		Extrusion of plastics Food and Pharmaceutical applications Mercury-free applications Dynamic pressure Injection-Blow moulding		Extrusion of plastics Food and Pharmaceutical applications Mercury-free applications Dynamic pressure Injection-Blow moulding	

INJECTION



IX
Current output



IJ-N (Voltage output)
IJ-D (Digital output) **CANopen**



MJ-N (Voltage output)
MJ-D (Digital output)

H 0,25%	M 0,5%	± 0,5%	± 0,25% FSO
0...35 to 0...1000bar 0...500 to 0...15000psi	0...3500bar 0...40000psi	0...2500bar 0...35000psi	
10...30 Vdc	15...30 Vdc N,C (IJ-N) 12...40 Vdc (IJ-D)	15...30 Vdc (MJ-N) 12...40 Vdc (MJ-D)	
20mA	Depends of FSO	10Vdc (MJ-N) Depends of FSO (MJ-D)	
4mA	0Vdc (IJ-N) 0 (IJ-D)	0Vdc (MJ-N) 0 (MJ-D)	
0...+85°C	0...+85°C	0...+85°C	
-20...+85°C	-30...+105°C	-30...+105°C	
350°C 660°F	350°C 660°F	400°C 750°F	
< ± 1,2% FSO	< ± 1% FSO	0,03bar/°C	
< ± 1% FSO	< ± 1% FSO	≤ 0,02%FSO/°C	
15-5 PH GTP coated	15-5 PH GTP coated	17-7 PH TiAlN coated	
IP65	IP65	IP65	
conn. 6 pin VPT07RA10-6PT (PT02A-10-6P) conn. 8 pin PC02E-12-8P	conn. 6-7-8 pin conn. 5 pole M12 (IJ-D)	conn. 5-7 pin	
1/2 - 20 UNF M18 x 1,5	1/2 - 20 UNF	1/2 - 20 UNF M10x1	
Flex sheathing	Flex sheathing	Flex sheathing	
Extrusion of plastics Extrusion of fiber Food and Pharmaceutical applications (Mercury free) Dynamic pressure	Injection presses for plastics. Pressure measurement in real time	Injection presses for plastics. Pressure measurement in real time	

Guide to selection of the diaphragm in contact with extruded polymer

SECTOR OF USE	MATERIAL WORKED	TEMPERATURE AND PROCESS PRESSURE	NOTES	SPECIAL VERSION
Heat insulation panels / Plexiglas; plastics for injection	PMMA (high viscosity), plexiglass	190-230°C	Standard diaphragm	000
Hydraulic tubes (drains, sewers, etc.)	PVC-U, UPVC, RPVC (high viscosity)	180-200°C	Standard diaphragm	026-109
Hydraulic tubes for heating, high pressure tubes, tubes for the chemical industry	PP (Polypropylene)	200-230°C	Standard diaphragm	000
Rugs and carpets (moquettes)	PP (Polypropylene)	200-230°C	Standard diaphragm	000
Plastic bags, wrapping films and tapes, low-cost laminates	PE-LD (Low density) (o LO-PE)	170-190°C	Standard diaphragm	000
Bags for potato chips, reclosable bags (W/K/I series)	PP (Polypropylene)	200-230°C	Use W series	000
Plastic bottles and other food applications (W/K/I series)	PET,		Use W series	000
Nylon films and tapes for packaging; covers with high mechanical strength and resistance to high temperatures (profiles, corners, etc..)	PA6 (Nylon 6)	210-260°C / P < 500bar	Special diaphragm with excellent resistance to contact with adhesive materials	123
Films, monofilaments and misc. profiles	PA66 (Nylon 66, Polyamide 66) / PVDF	210-290°C / P > 500bar	Special diaphragm with excellent resistance to contact with adhesive materials	110
Films for food (roast in a bag) (W/K/I series)	PA66 (Nylon 66, Polyamide 66)	265-290°C	Use W series	123
Packaging for food (DOMOPACK or "cheese paper") (W/K/I series)	PE-HD-High Density (o HD-PE)	180-210°C	Use W series with standard diaphragm	000
Building industry; mixers for tires	Highly abrasive plastics; extrusion at high flow rate; fiberglass, ceramics, mineral resins, rubber	fino a 400°C 200°C	Special diaphragm with high strength and resistance to abrasion and rod drift, accuracy and sensitivity	261 - B31
Insulating sheathing for electrical cables	PVC / Corrosive plastics	205-240°C 100-250bar	Special diaphragm, resistant to corrosive materials	109
Finishings (caravans, furniture, home appliances, freezers, formica, etc.)	ABS (Acrylonitrile Butadiene Styrene)		Special diaphragm, resistant to corrosive materials	109
Packing; building	Teflon, PC Polycarbonate-Makrolon, coloring agents; resin additives		Special diaphragm, resistant to adhesive materials	B31
Pharmaceutical use (W/K/I series)	Teflon, PC Polycarbonate-Makrolon, coloring agents; resin additives		Series K with special diaphragm or seies W with GTP standard	B31
Abrasive applications with moderate temperatures	Processes containing vitreous materials or abrasive resins		Special diaphragm with resistance to abrasion and rod drift, accuracy and sensitivity	B31
Abrasive applications	Processes containing vitreous materials or abrasive resins		Special diaphragm with resistance to abrasion and rod drift, accuracy and sensitivity	B31
Recycling of plastic materials	Bulk materials + solid impurities		Special diaphragm with resistance to abrasion and rod drift, accuracy and sensitivity	B31
Plastics industry FDA approved			W/K/I series with FDA approved coating	B39

Accessories

Safety devices

BURST DISKS -GRD-

The burst disk, also known as burst cap, is an entirely mechanical device designed to give way under a defined pressure. It is mounted on the extruder and prevents sudden and dangerous pressure increases in the machine by breaking and releasing pressure.

High accuracy (0,5%) and a pressure range of use make the GRD an excellent addition to traditional control devices, especially in emergencies demanding a rapid response time.

- Process connection: 1/2 20 UNF
- Tip size: 8mm
- Main characteristics: maximum working temperature 400°C
- Pressures: 2500/15000 psi

DRILLING AND CLEANING KIT




Drilling kit for 1/2 - 20 UNF	KF12	Cleaning kit for 1/2 - 20 UNF	CT12
Drilling kit for M18 - 1,5	KF18	Cleaning kit for M18 x 1,5	CT18
Drilling kit for M10x1 (only for MJ)	KF10	Cleaning kit for M10x1 (only for MJ)	CT10

BRACKETS AND PROTECTION PLUG




Bracket	SF18	Protection cap for 1/2 - 20 UNF	SC12
		Protection cap for M18x1,5	SC18
		Protection cap for M10x1 (only for MJ)	SC10

FEMALE CONNECTORS





6-pin female connector (IP65) CON300	5-pin female connector (IP65) CON031	8-pin female connector CON307
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TS3

Transducer simulator

The TS3 simulates the output of a Gefran mV/V melt pressure transducer (M3 and W3 series) at various pressure levels.

The TS3 simulates any strain gage-based transducer and is available in either a 6-pin (TS36) or 8-pin (TS38) version.

Extension cables



		For digital output
5-pin cable with 1 meter cable	(3,3ft)	PCAV310
5-pin cable with 2 meters cable	(7ft)	PCAV311
5-pin cable with 5 meters cable	(17ft)	PCAV314
	for not amplified output	for amplified output
6-pin cable with 8 meters cable	(25ft)	C08W
6-pin cable with 15 meters cable	(50ft)	C15W
6-pin cable with 25 meters cable	(75ft)	C25W
6-pin cable with 30 meters cable	(100ft)	C30W
8-pin cable with 8 meters cable	(25ft)	E08W
8-pin cable with 15 meters cable	(50ft)	E15W
8-pin cable with 25 meters cable	(75ft)	E25W
8-pin cable with 30 meters cable	(100ft)	E30W

CMI CAN-OPEN Module Interface for not-amplified transducer

The CAN OPEN module interface for not-amplified transducers has been developed to acquire low level signals from strain gage bridges (load cells, pressure transducers) and to convert them in digital format according to standard CAN OPEN DSP 404.

This module makes easier the creation of the CAN nets using sensors and standard transducers with savings on wiring costs.

This is the ideal solution for retrofitting or for the up-grade for systems and machineries.



Accessories for IJ and MJ series



5 pin female connector
(IP65) CON031



7 pin female connector
(IP40) CON320



7 pin female connector 90°C
(IP40) CON322



6 pin female connector
CON022



8 pin female connector
CON026



Bracket PKIT 172
(only for MJ)



Bracket PKIT 176
(only for MJ)

APPLICATIONS



Headquarter

GEFRAN Spa

Via Sebina, 74

25050 PROVAGLIO D'ISEO (BS) ITALY

Ph. +39 03098881

Fax +39 0309839063

info@gefran.com

Drive & Motion Control Unit

Via Carducci, 24

21040 GERENZANO (VA) ITALY

Ph. +39 02967601

Fax +39 029682653

info.motion@gefran.com



GEFRAN BENELUX

Lammerdries-Zuid 14A

B-2250 OLEN

Ph. +32 (0) 14248181

Fax. +32 (0) 14248180

info@gefran.be

GEFRAN BRASIL

ELETROELETRÔNICA

Avenida Dr. Altino Arantes,

377/379 Vila Clementino

04042-032 SÃO PAULO - SP

Ph. +55 (0) 1155851133

Fax +55 (0) 1132974012

gefran@gefran.com.br

GEFRAN DEUTSCHLAND

Philipp-Reis-Straße 9a

63500 SELIGENSTADT

Ph. +49 (0) 61828090

Fax +49 (0) 6182809222

vertrieb@gefran.de

GEFRAN SUISSE

Rue Fritz Courvoisier, 40

2302 LA CHAUX-DE-FONDS

Ph. +41 (0) 329684955

Fax +41 (0) 329683574

office@gefran.ch

GEFRAN FRANCE

4, rue Jean Desparmet - BP 8237

69355 LYON Cedex 08

Ph. +33 (0) 478770300

Fax +33 (0) 478770320

commercial@gefran.fr

GEFRAN UK Ltd

7 Pearson Road - Central Park

Telford - TF2 9TX

Ph. +44 (0) 8452 604555

Fax +44 (0) 8452 604556

sales@gefran.co.uk

GEFRAN S.p.A.

Sucursal en España

Josep Pla, 163-2º-6ª

08020 - Barcelona

comercial.espana@gefran.es

SIEI AREG - GmbH

Gottlieb-Daimler Strasse 17/3

D-74385 - Pleidelsheim

Ph. +49 (0) 7144 897360

Fax +49 (0) 7144 8973697

info@sieiareg.de

GEFRAN SIEI - ASIA

Blk.30 Loyang Way

03-19 Loyang Industrial Estate

508769 Singapore

Ph. +65 6 8418300

Fax +65 6 7428300

info@gefransiei.com.sg

GEFRAN SIEI Electric Pte Ltd

Block B, Gr:Flr, No.155, Fu Te Xi Yi Road,

Wai Gao Qiao Trade Zone Shanghai,

200131

Ph. +86 21 5866 7816

Ph. +86 21 5866 1555

gefransh@online.sh.cn

GEFRAN SIEI Drives Technology (Shanghai) Co., Ltd

No.1265, Bei He Road, Jiading

District, 201821 Shanghai, China

Ph. +86 21 69169898

Fax +86 21 69169333

info@gefransiei.com.cn

GEFRAN INDIA Pvt. Ltd.

Survey No.: 182/1 KH, Bhukum

Paud Road, Taluka, Mulshi

Dist.Pune-411042, MH, INDIA

Ph. +91 20 3939 4400

Fax +91 20 3939 4401

GEFRAN Inc.

Sensors and Automation

8 Lowell Avenue

WINCHESTER - MA 01890

Toll Free 1-888-888-4474

Fax +1 (781) 7291468

info@gefraninc.com

Motion and Drive Products

14201 D South Lakes Drive

CHARLOTTE - NC 28273

Toll Free 1-888-888-4474

Fax +1 (704) 3290217

salescontact@gefraninc.com

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