

# AT9000 Advanced Transmitter

## Flange type of Differential Pressure Transmitter

### OVERVIEW

AT9000 Advanced Transmitter is a microprocessor-based smart transmitter that features high performance and excellent stability. Capable of measuring gas, liquid, and vapor, and liquid levels, it transmits 4 to 20 mA DC analog and digital signals according to the measured differential pressure.

It can also execute two-way communications between the CommPad (Handy Communicator) or HART<sup>®</sup> 375 communicator, thus facilitating self-diagnosis, range resetting, and automatic zero adjustment.



### FEATURES

#### **Excellent stability and high performance**

- Long-term stability is proven in 500,000 installations worldwide.
- Unique characterization and composite semiconductor sensors realize excellent temperature and static pressure characteristics.

#### **A diverse lineup**

- A diverse flange lineup, ranging from small diameter 1.5 inch (40 mm) and 2 inches (50 mm) to 3 inches (80 mm), is available to meet user requirements.
- A wide variety of models, including those for standard differential pressure and high differential pressure, is available to meet user requirements.
- A wide variety of corrosion-resistant materials for wetted parts is also available.

#### **Remote communication**

- Two-way communication using digital output facilitates self-diagnosis, range resetting, automatic zero adjustment, and other operations.
- HART<sup>®</sup> protocol communication is available. (Option)

#### **China RoHS**

This device is used in the Oil & Gas, Petrochemical, Chemical, Pulp & Paper, Food & Beverage, Machinery, Steel/Metal & Mining, and Automobile industries and therefore does not fall under the China RoHS Legislation.

If this device is used in semiconductor manufacturing equipment, labeling on the device and documents for the China RoHS may be required. If such documents are required, consult a Yamatake representative.

HART<sup>®</sup> is a registered trademark of the HART Communication Foundation.

**APPLICATION****Petroleum / Petrochemical / Chemical**

For measuring pressures, liquid levels, and ordinary surface levels in tanks of all sizes.

**Electric power / City gas / Other utilities**

For measurement applications that require high degrees of stability and accuracy.

**Pulp and paper**

- For lines that need transmitters resistant to chemical liquids, corrosive fluids and the like.
- For measuring pressures, liquid levels, and boundary surface levels in tanks
- For measuring pressure, liquid levels, and boundary surface levels in tanks of all sizes.

**Iron and steel / Nonferrous metal / Ceramics**

For lines that require stable measurement under strictly controlled (temperature, humidity, etc.) conditions.

**Machinery / Shipbuilding**

For lines that require stable measurement under strictly controlled (temperature, humidity, etc.) conditions.

**FUNCTIONAL SPECIFICATIONS****Type of protection**

NEMA3 and 4X  
IEC IP67

**FM Explosionproof and Dust Approvals**

Explosionproof for Class I, Division 1, Groups A, B, C and D; Class I, Zone 1, AEx d IIC  
Dust-Ignitionproof for Class II, III, Division 1, Groups E, F and G

T5 -40°C ≤ Tamb ≤ +85°C

Hazardous locations

Indoor / Outdoor Type 4X, IP67

Factory sealed, conduit seal not required for Division applications

Caution - Use supply wires suitable for 5°C above surrounding ambient

**FM Intrinsically safe Approval**

IS/I,II,III/1/ABCDEFGH/T4; -40 °C ≤ Tamb ≤ +60 °C; 80395278, 80395279,80395280; Entity; TYPE 4X; IP67  
I/0/ AEx ia/IIC/T4; -40 °C ≤ Tamb ≤ +60 °C;80395278, 80395279, 80395280; Entity; TYPE 4X;IP67  
Entity Parameters: Vmax(Ui)=30 Volts, Imax(Ii)=100mA, Pi=1W, Ci=10nF, Li=0.5mH

**FM Nonincendive Approval**

NI/I/2/ABCD/T4; -40 °C ≤ Tamb ≤ +60 °C;80395494; NIFW; TYPE 4X; IP67

NI/I/2/IIC/T4; -40 °C ≤ Tamb ≤ +60 °C; 80395494; NIFW; TYPE 4X; IP67

S/II,III/1/EFG/T4; -40 °C ≤ Tamb ≤ +60 °C; 80395494;NIFW; TYPE 4X; P67

Nonincendive Field Wiring Parameters: Vmax(Ui)=30 Volts, Ci=10nF, Li=0.5mH

**ATEX Flameproof and Dust Certifications**

CE 0344  KEMA 08ATEX0004

II 1/2 G Ex d IIC T6 Tprocess=85°C  
-30°C ≤ Tamb ≤ +75°C IP66/67

II 1/2 G Ex d IIC T5 Tprocess=100°C  
-30°C ≤ Tamb ≤ +80°C IP66/67

II 1/2 G Ex d IIC T4 Tprocess=110°C  
-30°C ≤ Tamb ≤ +80°C IP66/67


II 2 D Ex tD A21 IP66/67 T85 Tprocess=85°C  
-30°C ≤ Tamb ≤ +75°C

II 2 D Ex tD A21 IP66/67 T100 Tprocess=100°C  
-30°C ≤ Tamb ≤ +75°C

II 2 D Ex tD A21 IP66/67 T110 Tprocess=110°C  
-30°C ≤ Tamb ≤ +75°C

Caution - Use supply wires suitable for 5°C above surrounding ambient

**ATEX Intrinsic safety and Dust Certifications**

CE 0344  KEMA 07ATEX0200 X

II 1 G Ex ia IIC T4 TPROCESS = 105 °C

-30 °C ≤ Tamb ≤ +60 °C IP66 / 67

ELECTRICAL PARAMETERS: Ui = 30 V, Ii = 93 mA, Pi = 1 W, Ci = 5 nF, Li = 0.5 mH

II 1 D Ex iaD 20 IP66 / 67 T105 TPROCESS = 105 °C  
-30 °C ≤ Tamb ≤ +60 °C

**ATEX Type n and Dust Certifications**

CE 0344  KEMA 07ATEX0200 X

II 3 G Ex nL IIC T4 TPROCESS = 105 °C

-30 °C ≤ Tamb ≤ +60 °C IP66 / 67

ELECTRICAL PARAMETERS: Ui = 30 V, Ci = 5 nF, Li = 0.5 mH

II 2 D Ex tD A21 IP66 / 67 T85 TPROCESS = 85 °C  
-30 °C ≤ Tamb ≤ +75 °C

II 2 D Ex tD A21 IP66 / 67 T100 TPROCESS = 100 °C  
-30 °C ≤ Tamb ≤ +80 °C

II 2 D Ex tD A21 IP66 / 67 T110 TPROCESS = 110 °C  
-30 °C ≤ Tamb ≤ +80 °C

**NEPSI Flameproof and Dust Certifications**

Ex d IIC T6 DIP A21 TA 85°C Tprocess=80°C -40°C ≤ Tamb ≤ +75°C

Ex d IIC T5 DIP A21 TA 100°C Tprocess=95°C -40°C ≤ Tamb ≤ +80°C

Ex d IIC T4 DIP A21 TA 115°C Tprocess=110°C -40°C ≤ Tamb ≤ +80°C

ENCLOSURE TYPE IP66/67

Certificate No. GYJ071268

**NEPSI Intrinsic Safety Certification**

Ex ia IIC T4 Tprocess=105°C -40°C ≤ Tamb ≤ +60°C  
Enclosure IP66 / 67

Electrical Parameters: Ui=30V, Ii=100mA, Pi=1W, Ci=13nF, Li=0.5mH

Certificate No. GYJ071269

**NEPSI Type n Certification**

Ex nL IIC T4 Tprocess=110°C -40°C ≤ Tamb ≤ +60°C  
Enclosure IP66 / 67

Electrical Parameters: Ui=30V, Ii=100mA, Pi=1W, Ci=13nF, Li=0.5mH

Certificate No. GYJ071269

**IECEX Flameproof and Dust Certifications**

Certificate No. IECEX KEM 08.0001  
 Ga/Gb Ex d IIC T6 T<sub>process</sub>=85°C -30°C ≤ Tamb ≤ +75°C IP66/67  
 Ga/Gb Ex d IIC T5 T<sub>process</sub>=100°C -30°C ≤ Tamb ≤ +80°C IP66/67  
 Ga/Gb Ex d IIC T4 T<sub>process</sub>=110°C -30°C ≤ Tamb ≤ +80°C IP66/67  
 Ex tD A21 IP66/67 T85 T<sub>process</sub>=85°C -30°C ≤ Tamb ≤ +75°C  
 Ex tD A21 IP66/67 T100 T<sub>process</sub>=100°C -30°C ≤ Tamb ≤ +75°C  
 Ex tD A21 IP66/67 T110 T<sub>process</sub>=110°C -30°C ≤ Tamb ≤ +75°C  
 Caution - Use supply wires suitable for 5°C above surrounding ambient

**IECEX Intrinsic safety and Dust Certifications**

IECEX KEM 07.0058X  
 Zone 0 Ex ia IIC T4 T<sub>PROCESS</sub> = 105 °C  
 -30 °C ≤ Tamb ≤ +60 °C IP66 / 67  
 ELECTRICAL PARAMETERS: Ui = 30 V, Ii = 93 mA, Pi = 1 W, Ci = 5 nF, Li = 0.5 mH  
 Ex iaD 20 IP66 / 67 T105 T<sub>PROCESS</sub> = 105 °C  
 -30 °C ≤ Tamb ≤ +60 °C

**IECEX Type n and Dust Certifications**

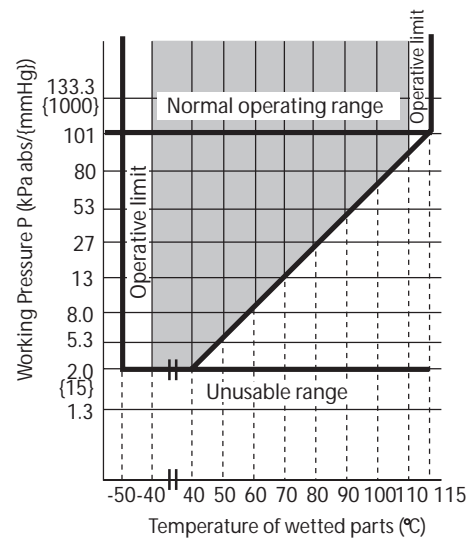
IECEX KEM 07.0058X  
 Ex nL IIC T4 T<sub>PROCESS</sub> = 105 °C  
 -30 °C ≤ Tamb ≤ +60 °C IP66 / 67  
 ELECTRICAL PARAMETERS: Ui = 30 V, Ci = 5 nF, Li = 0.5 mH  
 Ex tD A21 IP66 / 67 T85 T<sub>PROCESS</sub> = 85 °C  
 -30 °C ≤ Tamb ≤ +75 °C  
 Ex tD A21 IP66 / 67 T100 T<sub>PROCESS</sub> = 100 °C  
 -30 °C ≤ Tamb ≤ +80 °C  
 Ex tD A21 IP66 / 67 T110 T<sub>PROCESS</sub> = 110 °C  
 -30 °C ≤ Tamb ≤ +80 °C

**EMC Conformity**

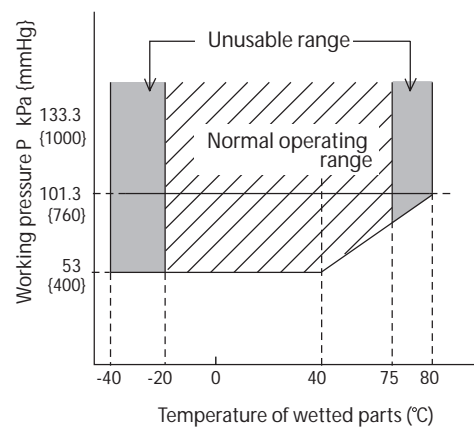
89/336/EEC, 92/31/EEC, 93/68/EEC Electromagnetic Compatibility (EMC) Directive

**Measuring span / Setting range / Working pressure range**

	Measuring span	Setting range	Working pressure range
GTX 35F	2.5 to 100kPa {250 to 10160 mmH <sub>2</sub> O}	-100 to 100kPa {-10160 to 10160 mmH <sub>2</sub> O}	Up to flange rating (for negative pressures, see Figure 1 and Figure 2)
GTX 60F	35 to 3500kPa {0.35 to 35 kgf/cm <sup>2</sup> }	-100 to 3500kPa {-1~35 kgf/cm <sup>2</sup> }	



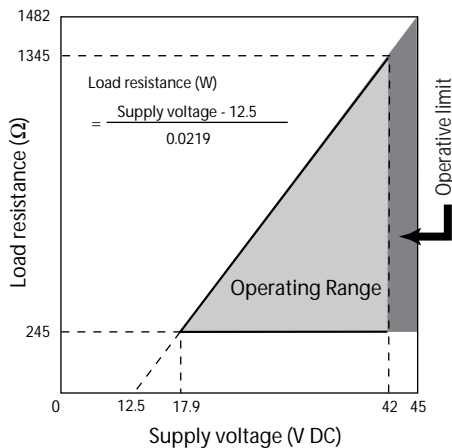
**Figure 1 Working pressure and temperature of wetted parts section**



**Figure 2 Working pressure and temperature of wetted parts section (for oxygen and chlorine service)**

## Supply voltage and load resistance

17.9 to 42V DC. A load resistance of 250 Ω or more is necessary between loops. See Figure 3.



**Figure 3** Supply voltage vs. load resistance characteristics

*Note* For communication with HART communicator, a load resistance of 250 Ω or more is necessary.

## Output

Analog output (4 to 20 mA DC) with DE protocol  
Analog output (4 to 20 mA DC) with HART protocol

## Output signal

3.6 to 21.6 mA  
3.8 to 20.5 mA (NAMUR NE43 compliant)

## Failure Alarm

Upper: 21.6 mA or more  
Lower: 3.6 mA or less

## Ambient temperature limits

### Normal operating range

-30 to 75°C for general purpose models  
-10 to 75°C for oxygen and chlorine models  
-25 to 75°C for models with digital indicators

### Operative limits

-50 to 80°C for general purpose models  
-40 to 80°C for oxygen and chlorine models  
-30 to 80°C for models with digital indicators

## Temperature ranges wetted parts

### Normal operating range

-40 to 110°C for general purpose models  
-20 to 75°C for oxygen and chlorine models

### Operative limits

-50 to 115°C for general purpose models  
-40 to 80°C for oxygen and chlorine models

## Ambient humidity limits

5 to 100% RH

## Stability against supply voltage change

± 0.005% FS/V

## Dead time

Max: 0.4 sec.

## Damping time

Selectable from 0 to 32 sec. in ten stages

## Lightning protection

Applicable Standards; IEC 61000-4-5

Peak value of current surge(80/20μ sec.): 6000A

## Indicator

The digital LCD indicator (optional) indicates engineering units and can be set freely between -99999 and 99999 (5 digits). For meter calibration, specify the following items when placing your order.

- Meter calibration range
- Meter calibration unit
- Linear / Square-root for meter indication.

Various kinds of data can be set using the CommPad or the HART<sup>®</sup>375 communicator.

## Bolts and nuts materials (for fastening meter body cover)

Carbon steel (SNB7), 304 SST, 630 SST

## Paint

### Standard

Corrosion-resistant paint (Baked acrylic paint)

### Corrosion-proof finish

Corrosion-proof paint (Baked epoxy paint), fungus-proof finish

### Corrosion-resistant finish (silver paint)

Transmitter case is coated with silver paint in addition to the above corrosion-resistant finish.

## OPTIONAL SPECIFICATIONS

### FEP protective film

Use FEP protective films when corrosive fluids are used or to avoid metal ions contact.

### Working temperature range

0 to 110°C

### Working pressure range

Atmospheric pressure to flange rating  
(up to JIS10K, ANSI / JPI 150)  
(Not usable under negative pressure)

### Oil free finish

The transmitter is shipped with oil-free wetted parts.

### External zero/span adjustment function

The transmitter can be easily zero/span adjusted in the field.

### Elbow

This is an adaptor for changing the electrical conduit connection port from the horizontal to the vertical direction, if required by wiring conditions in the field. One or two elbows may be used as needed.

### Conformance to SI units

We deliver transmitters set to any SI units as specified.

**PHYSICAL SPECIFICATIONS****Materials****Fill fluid**

Silicone oil for general purpose models  
Fluorine oil for oxygen and chlorine models

**Center body**

316 SST

**Transmitter case**

Aluminum alloy

**Meter body cover**

SCS14A (equivalent to 316 SST) or 316 SST

**For Wetted parts****Adapter flange (option)**

SCS14A (equivalent to 316 SST)

**Center body**

316 SST (316L SST for diaphragm only)  
ASTM B575 (Hastelloy C-276 equivalent), Tantalum,  
316L SST

**Vents and plugs**

316 SST

**Gaskets**

FEP

**Flange materials**

304 SST, 316 SST, 316L SST

**Weight**

Approx. 5.9 kg (in case of ANSI 150# - 1-1/2 inches flange)

**INSTALLATION****Electrical connection**

1/2NPT internal thread, M20 internal thread.

**Grounding**

Resistance 100 Ω max

**Mounting**

Direct mounting on the process side

**Process connection****Measured pressure (liquid side)****Flush diaphragm**

ANSI 150, 300 and 600:1.5 / 2 / 3 inches (RF) equivalent

**Extended diaphragm**

ANSI 150, 300 and 600:2 / 3 / 4 inches (RF) equivalent

**Standard pressure side**

Rc1/2, 1/2NPT internal thread, Rc1/4, 1/4NPT internal thread, atmospheric disconnection hole.

** WARNING**

- Impact to transmitter can damage sensor module.

**PERFORMANCE SPECIFICATIONS**

**Max working pressure**

- Note) 1. Max. working pressure depends on flange rating, flange materials and operating temperature. Please refer to the following data. Operating range of temperature depends on specification of transmitters.
- Note) 2. In case of flange type (GTX60F) and remote sealed type (GTX60U), max working pressure depends on the smaller value of either 1.5 MPa or following data.
- Note) 3. In case of remote sealed type (GTX71U), max working pressure depends on the smaller value of either 10 MPa or following data.

	<b>JIS</b>	<b>JPI/ANSI</b>
<b>304 SST</b>		
<b>316 SST</b>		
<b>316L SST</b>		

**Reference accuracy**

Shown for each item are the percentage ratio for  $\chi$  (kPa), which is the greatest value of either the upper range value (URV)<sup>\*1</sup>, the lower range value (LRV)<sup>\*2</sup> or the span.

**Model GTX35F**

Material of Wetted Parts at Flange Side: 316 SST (Diaphragm; 316L SST), 316L SST,

Material of Wetted parts at reference side: 316 SST (Diaphragm; 316L SST)

<b>Reference accuracy (*4)</b>	Linear output:	$\pm 0.2\%$	(For $\chi \geq 12.5$ kPa {1250 mmH <sub>2</sub> O})
		$\pm\left(0.05 + 0.15 \times \frac{12.5}{\chi}\right) \%$	(For $\chi < 12.5$ kPa {1250 mmH <sub>2</sub> O})
<b>Ambient Temperature effect (Shift from the set range) Change of 30°C (Range from -5 to 55°C)</b>	Combined shift: (including zero and span shifts)	$\pm 1.45\%$	(For $\chi \geq 12.5$ kPa {1250 mmH <sub>2</sub> O})
		$\pm\left(0.35 + 1.1 \times \frac{12.5}{\chi}\right) \%$	(For $\chi < 12.5$ kPa {1250 mmH <sub>2</sub> O})
<b>Static pressure effect (Shift in respect to setting range) Change of 7 MPa {70 kgf/cm<sup>2</sup>}</b>	Zero shift:	$\pm\left(0.03 + 0.64 \times \frac{25}{\chi}\right) \%$	
	Combined shift: (including zero and span shifts)	$\pm 0.97\%$	(For $\chi \geq 25$ kPa {2500 mmH <sub>2</sub> O})
		$\pm\left(0.03 + 0.94 \times \frac{25}{\chi}\right) \%$	(For $\chi < 25$ kPa {2500 mmH <sub>2</sub> O})

**Model GTX60F**

Material of Wetted Parts at Flange Side: 316 SST (Diaphragm; 316L SST), 316L SST,

Material of Wetted parts at reference side: 316 SST (Diaphragm; 316L SST)

<b>Reference accuracy (*3)(*4)</b>	Linear output:	$\pm 0.15\%$	(For $\chi \geq 350$ kPa {3.5 kgf/cm <sup>2</sup> })
		$\pm\left(0.05 + 0.1 \times \frac{350}{\chi}\right) \%$	(For $\chi < 350$ kPa {3.5 kgf/cm <sup>2</sup> })
<b>Ambient Temperature effect (Shift from the set range) Change of 30°C (*3) (Range from -5 to 55°C)</b>	Combined shift: (including zero and span shifts)	$\pm 0.75\%$	(For $\chi \geq 350$ kPa {3.5 kgf/cm <sup>2</sup> })
		$\pm\left(0.35 + 0.4 \times \frac{350}{\chi}\right) \%$	(For $\chi < 350$ kPa {3.5 kgf/cm <sup>2</sup> })
<b>Static pressure effect (Shift in respect to setting range) (*3) Change of 7 MPa {70 kgf/cm<sup>2</sup>}</b>	Zero shift:	$\pm\left(0.03 + 7.5 \times \frac{350}{\chi}\right) \%$	
	Combined shift: (including zero and span shifts)	$\pm 9.00\%$	(For $\chi \geq 350$ kPa {3.5 kgf/cm <sup>2</sup> })
		$\pm\left(1.5 + 7.5 \times \frac{350}{\chi}\right) \%$	(For $\chi < 350$ kPa {3.5 kgf/cm <sup>2</sup> })

Note) \*1) URV denotes the process value for 100% (20 mA DC) output.

\*2) LRV denotes the process value for 0% (4 mA DC) output.

\*3) Within a range of  $URV \geq 0$  and  $LRV \geq 0$ .

\*4) Reference accuracy at calibrated condition.

**Model GTX35F**

Material of Wetted Parts at Flange Side: ASTM B575 (Hastelloy C-276 equivalent), Tantalum,

Material of Wetted parts at reference side: 316 SST (Diaphragm; 316L SST)

<b>Reference accuracy (*4)</b>	Linear output:	$\pm 0.4\%$	(For $\chi \geq 12.5$ kPa {1250 mmH <sub>2</sub> O})
		$\pm\left(0.25 + 0.15 \times \frac{12.5}{\chi}\right) \%$	(For $\chi < 12.5$ kPa {1250 mmH <sub>2</sub> O})
<b>Ambient Temperature effect (Shift from the set range) Change of 30°C (Range from -5 to 55°C)</b>	Combined shift: (including zero and span shifts)	$\pm\left(0.6 + 2.4 \times \frac{25}{\chi}\right) \%$	
<b>Static pressure effect (Shift in respect to setting range) Change of 7 MPa {70 kgf/cm<sup>2</sup>}</b>	Zero shift:	$\pm\left(0.03 + 1.64 \times \frac{25}{\chi}\right) \%$	
	Combined shift: (including zero and span shifts)	$\pm\left(1.07 + 1.0 \times \frac{25}{\chi}\right) \%$	(For $\chi \geq 25$ kPa {2500 mmH <sub>2</sub> O})
		$\pm\left(0.13 + 1.94 \times \frac{25}{\chi}\right) \%$	(For $\chi < 25$ kPa {2500 mmH <sub>2</sub> O})

**Model GTX60F**

Material of Wetted Parts at Flange Side: ASTM B575 (Hastelloy C-276 equivalent), Tantalum,

Material of Wetted parts at reference side: 316 SST (Diaphragm; 316L SST)

<b>Reference accuracy (*3)(*4)</b>	Linear output:	$\pm 0.3\%$	(For $\chi \geq 350$ kPa {3.5 kgf/cm <sup>2</sup> })
		$\pm\left(0.15 + 0.15 \times \frac{350}{\chi}\right) \%$	(For $\chi < 350$ kPa {3.5 kgf/cm <sup>2</sup> })
<b>Ambient Temperature effect (Shift from the set range) Change of 30°C (*3) (Range from -5 to 55°C)</b>	Combined shift: (including zero and span shifts)	$\pm\left(0.35 + 0.65 \times \frac{350}{\chi}\right) \%$	
<b>Static pressure effect (Shift in respect to setting range) (*3)</b>	Zero shift:	$\pm\left(0.03 + 8.5 \times \frac{350}{\chi}\right) \%$	
	Combined shift: (including zero and span shifts)	$\pm 9.0\%$	(For $\chi \geq 350$ kPa {3.5 kgf/cm <sup>2</sup> })
		$\pm\left(1.5 + 7.5 \times \frac{350}{\chi}\right) \%$	(For $\chi < 350$ kPa {3.5 kgf/cm <sup>2</sup> })

Note) \*3) Within a range of URV  $\geq 0$  and LRV  $\geq 0$ .

\*4) Reference accuracy at calibrated condition.

**Model GTX35F (For option “M5”, 0.1mm thickness diaphragm)**

Material of Wetted Parts at Flange Side: 316 SST (Diaphragm; 316L SST), 316L SST,

Material of Wetted parts at reference side: 316 SST (Diaphragm; 316L SST)

<b>Reference accuracy (*4)</b>	Linear output:	$\pm 0.8\%$	(For $\chi \geq 12.5$ kPa {1250 mmH <sub>2</sub> O})
		$\pm\left(0.15 + 0.3 \times \frac{12.5}{\chi}\right) \%$	(For $\chi < 12.5$ kPa {1250 mmH <sub>2</sub> O})
<b>Ambient Temperature effect (Shift from the set range) Change of 30°C (Range from -5 to 55°C)</b>	Combined shift: (including zero and span shifts)	$\pm\left(0.6 + 5.4 \times \frac{25}{\chi}\right) \%$	
<b>Static pressure effect (Shift in respect to setting range) Change of 7 MPa {70 kgf/cm<sup>2</sup>}</b>	Zero shift:	$\pm\left(0.64 + 2.64 \times \frac{25}{\chi}\right) \%$	
	Combined shift: (including zero and span shifts)	$\pm\left(1.17 + 2.0 \times \frac{25}{\chi}\right) \%$	(For $\chi \geq 25$ kPa {2500 mmH <sub>2</sub> O})
		$\pm\left(0.23 + 2.94 \times \frac{25}{\chi}\right) \%$	(For $\chi < 25$ kPa {2500 mmH <sub>2</sub> O})

**Model GTX60F (For option “M5”, 0.1mm thickness diaphragm)**

Material of Wetted Parts at Flange Side: 316 SST (Diaphragm; 316L SST), 316L SST,

Material of Wetted parts at reference side: 316 SST (Diaphragm; 316L SST)

<b>Reference accuracy (*3)(*4)</b>	Linear output:	$\pm 0.6\%$	(For $\chi \geq 350$ kPa {3.5 kgf/cm <sup>2</sup> })
		$\pm\left(0.3 + 0.3 \times \frac{350}{\chi}\right) \%$	(For $\chi < 350$ kPa {3.5 kgf/cm <sup>2</sup> })
<b>Ambient Temperature effect (Shift from the set range) Change of 30°C (*3) (Range from -5 to 55°C)</b>	Combined shift: (including zero and span shifts)	$\pm\left(0.35 + 2.6 \times \frac{350}{\chi}\right) \%$	
<b>Static pressure effect (Shift in respect to setting range) (*3)</b>	Zero shift:	$\pm\left(0.03 + 9.5 \times \frac{350}{\chi}\right) \%$	
	Combined shift: (including zero and span shifts)	$\pm 9.0\%$	(For $\chi \geq 350$ kPa {3.5 kgf/cm <sup>2</sup> })
		$\pm\left(1.5 + 7.5 \times \frac{350}{\chi}\right) \%$	(For $\chi < 350$ kPa {3.5 kgf/cm <sup>2</sup> })

Note) \*3) Within a range of URV  $\geq 0$  and LRV  $\geq 0$ .

\*4) Reference accuracy at calibrated condition.

**MODEL SELECTION**

**Model GTX35F(Flange type for standard differential pressure)**

**Model GTX60F(Flange type for high differential pressure)**

Model No.:GTX\_ \_F-Selection I(I II III IV V VI VII)-Selection II(I II III IV V VI)-Option

Basic Model No.

Measuring span	2.5 to 100kPa (250 to 10,160mmH <sub>2</sub> O)	GTX35F	Flush flange type 3 inches (80mm)
	35 to 3500kPa (0.35 to 35kgf/cm <sup>2</sup> )	GTX60F	

Selection I

I	Output	4 to 20mA (SFN Communication)	A
		4 to 20mA (HART Communication)	B
II	Fill fluid	Regular type (Silicone oil)	A
		For oxygen service (Fluorine oil)	H
		For chlorine service (Fluorine oil) *1	J
III	Material (Meter-body cover, Vent/ Drain plugs)	Meterbody cover	Vent / Drain plugs
		SCS14A	
IV	Material (center-body)	Reference side	Wetted part of flange side
		316 SST	316 SST (Diaphragm: 316L SST)
		316 SST	ASTM B575
		316 SST	Tantalum *1
		316 SST	316L SST
V	Process connections of reference side	Rc 1/2, with adapter flange	A
		Rc 1/4, with adapter flange	B
		Rc 1/4, without adapter flange	C
		1/2 NPT internal thread, with adapter flange	D
		1/4 NPT internal thread, with adapter flange	E
		1/4 NPT internal thread, without adapter flange	F
		Open to atmosphere *3	H
VI	Process installation of reference side	No connection *3	X
		Vertical piping, top connection	A
		Vertical piping, bottom connection	B
VII	Flange rating	ANSI150	A1
		ANSI300	A2
		ANSI600	A3
VIII	Flange size	3in./80A	F
IX	Flange type	Flush type	A
X	Flange material/bolt and nut material	Flange	Bolt and nut
		304 SST	304 SST
		304 SST	Carbon steel
		316 SST	304 SST
		316 SST	Carbon steel
XI	Gasket face finish	None Standard JISRa3.2(12.5S)	A

Selection II

I	Electrical connection	1/2 NPT, Watertight	A
		M20, Watertight *2	B
II	Explosion proof	None	XX
		FM Explosion proof	F1
		FM Intrinsically safe	F2
		FM Nonincendive	F5
		ATEX Explosion proof	A1
		ATEX Intrinsically safe	A2
		ATEX Type n	A5
		IECEX Explosion proof,	E1
		IECEX Intrinsically safe	E2
		IECEX Type n	E5
		NEPSI Explosionproof	N1
		NEPSI Intrinsically safe	N2
		NEPSI Type n	N5
III	Built-in indicating smart meter	None	X
		With indicator	A
IV	Paint	Standard	X
		Corrosion-resistant	A
		Corrosion-proof	B
		Corrosion-resistant (Silver coating)	D
V	Burnout feature	UP Scale	A
		DOWN scale	B
VI	Mounting Bracket	None	X

Note) \*1 In case code J is selected, code C "Tantalum", wetted part material of flange side should be selected.

\*2 Not applicable for the combination with code F1 "FM Explosion proof" of Explosion proof.

\*3 In case code M is selected, code X "No connection" of process installation of reference side should be selected.

**Model GTX35F(Flange type for standard differential pressure)**

**Model GTX60F(Flange type for high differential pressure)**

Model No.:GTX\_ \_F-Selection I(I II III IV V VI VII)-Selection II(I II III IV V VI)-Option

Basic Model No.

	Measuring span	2.5 to 100kPa (250 to 10,160mmH <sub>2</sub> O)	GTX35F	Extended flange type 4 inches (100mm)
		35 to 3500kPa (0.35 to 35kgf/cm <sup>2</sup> )	GTX60F	

Selection I

I	Output	4 to 20mA (SFN Communication)	A	
		4 to 20mA (HART Communication)	B	
II	Fill fluid	Regular type (Silicone oil)	A	
		For oxygen service (Fluorine oil)	H	
III	Material (Meter-body cover, Vent/ Drain plugs)	Meterbody cover	Vent / Drain plugs	
		SCS14A	316 SST	A
IV	Material (center-body)	Reference side	Wetted part of flange side	
		316 SST	316 SST (Diaphragm: 316L SST)	
		316 SST	316L SST	
V	Process connections of reference side	Rc 1/2, with adapter flange	A	
		Rc 1/4, with adapter flange	B	
		Rc 1/4, without adapter flange	C	
		1/2 NPT internal thread, with adapter flange	D	
		1/4 NPT internal thread, with adapter flange	E	
		1/4 NPT internal thread, without adapter flange	F	
		Open to atmosphere *2	H	
VI	Process installation of reference side	No connection *2	X	
		Vertical piping, top connection	A	
		Vertical piping, bottom connection	B	
VII	Flange rating	ANSI150	A1	
		ANSI300	A2	
		ANSI600	A3	
VIII	Flange size	4in./100A	G	
IX	Flange type	Extended Length 50mm	B	
		Extended Length 100mm	C	
		Extended Length 150mm	D	
		Extended Length 200mm	E	
		Extended Length 250mm	F	
		Extended Length 300mm	G	
X	Flange material/bolt and nut material	Flange	Bolt and nut	
		304 SST	304 SST	
		304 SST	Carbon steel	
		316 SST	304 SST	
		316 SST	Carbon steel	
XI	Gasket face finish	None Standard JISRa3.2(12.5S)	A	

Selection II

I	Electrical connection	1/2 NPT, Watertight	A	
		M20, Watertight *1	B	
II	Explosion proof	None	XX	
		FM Explosion proof	F1	
		FM Intrinsically safe	F2	
		FM Nonincendive	F5	
		ATEX Explosion proof	A1	
		ATEX Intrinsically safe	A2	
		ATEX Type n	A5	
		IECEX Explosion proof,	E1	
		IECEX Intrinsically safe	E2	
		IECEX Type n	E5	
		NEPSI Explosionproof	N1	
		NEPSI Intrinsically safe	N2	
		NEPSI Type n	N5	
		III	Built-in indicating smart meter	None
With indicator	A			
IV	Paint	Standard	X	
		Corrosion-proof	B	
		Corrosion-resistant (Silver coating)	D	
V	Burnout feature	UP Scale	A	
		DOWN scale	B	
VI	Mounting Bracket	None	X	

Note) \*1 Not applicable for the combination with code F1 "FM Explosion proof" of Explosion proof.

\*2 In case code M is selected, code X "No connection" of process installation of reference side should be selected.



**Model GTX35F(Flange type for standard differential pressure)**

**Model GTX60F(Flange type for high differential pressure)**

Model No.:GTX\_ \_F-Selection I(I II III IV V VI VII)-Selection II(I II III IV V VI)-Option

Basic Model No.

	Measuring span	2.5 to 100kPa (250 to 10,160mmH20)	GTX35F	Extended flange type 3 inches (80mm),2 inches(50m)
		35 to 3500kPa (0.35 to 35kgf/cm2)	GTX60F	

Selection I

I	Output	4 to 20mA (SFN Communication)	A
		4 to 20mA (HART Communication)	B
II	Fill fluid	Regular type (Silicone oil)	A
		For oxygen service (Fluorine oil)	H
III	Material (Meter-body cover, Vent/ Drain plugs)	Meterbody cover	Vent / Drain plugs
		SCS14A	
IV	Material (center-body)	Reference side	Wetted part of flange side
		316 SST	316 SST (Diaphragm: 316L SST)
		316 SST	316L SST
V	Process connections of reference side	Rc 1/2, with adapter flange	A
		Rc 1/4, with adapter flange	B
		Rc 1/4, without adapter flange	C
		1/2 NPT internal thread, with adapter flange	D
		1/4 NPT internal thread, with adapter flange	E
		1/4 NPT internal thread, without adapter flange	F
		Open to atmosphere *2	H
VI	Process installation of reference side	No connection *2	X
		Vertical piping, top connection	A
		Vertical piping, bottom connection	B
VII	Flange rating	ANSI150	A1
		ANSI300	A2
		ANSI600	A3
VIII	Flange size	2in./50A	E
		3in./80A	F
IX	Flange type	Extended Length 50mm	B
		Extended Length 100mm	C
		Extended Length 150mm	D
X	Flange material/bolt and nut material	Flange	Bolt and nut
		304 SST	304 SST
		304 SST	Carbon steel
		316 SST	304 SST
XI	Gasket face finish	316 SST	H
		Carbon steel	
		None Standard JISRa3.2(12.5S)	A

Selection II

I	Electrical connection	1/2 NPT, Watertight	A
		M20, Watertight *1	B
II	Explosion proof	None	XX
		FM Explosion proof	F1
		FM Intrinsically safe	F2
		FM Nonincendive	F5
		ATEX Explosion proof	A1
		ATEX Intrinsically safe	A2
		ATEX Type n	A5
		IECEX Explosion proof,	E1
		IECEX Intrinsically safe	E2
		IECEX Type n	E5
		NEPSI Explosionproof	N1
		NEPSI Intrinsically safe	N2
III	Built-in indicating smart meter	None	X
		With indicator	A
IV	Paint	Standard	X
		Corrosion-proof	B
		Corrosion-resistant (Silver coating)	D
V	Burnout feature	UP Scale	A
		DOWN scale	B
VI	Mounting Bracket	None	X

Note) \*1 Not applicable for the combination with code F1 "FM Explosion proof" of Explosion proof.

\*2 In case code M is selected, code X "No connection" of process installation of reference side should be selected.

Model No.:GTX\_\_D-Selection I(I II III IV V VI VII)-Selection II(I II III IV V VI)-Option

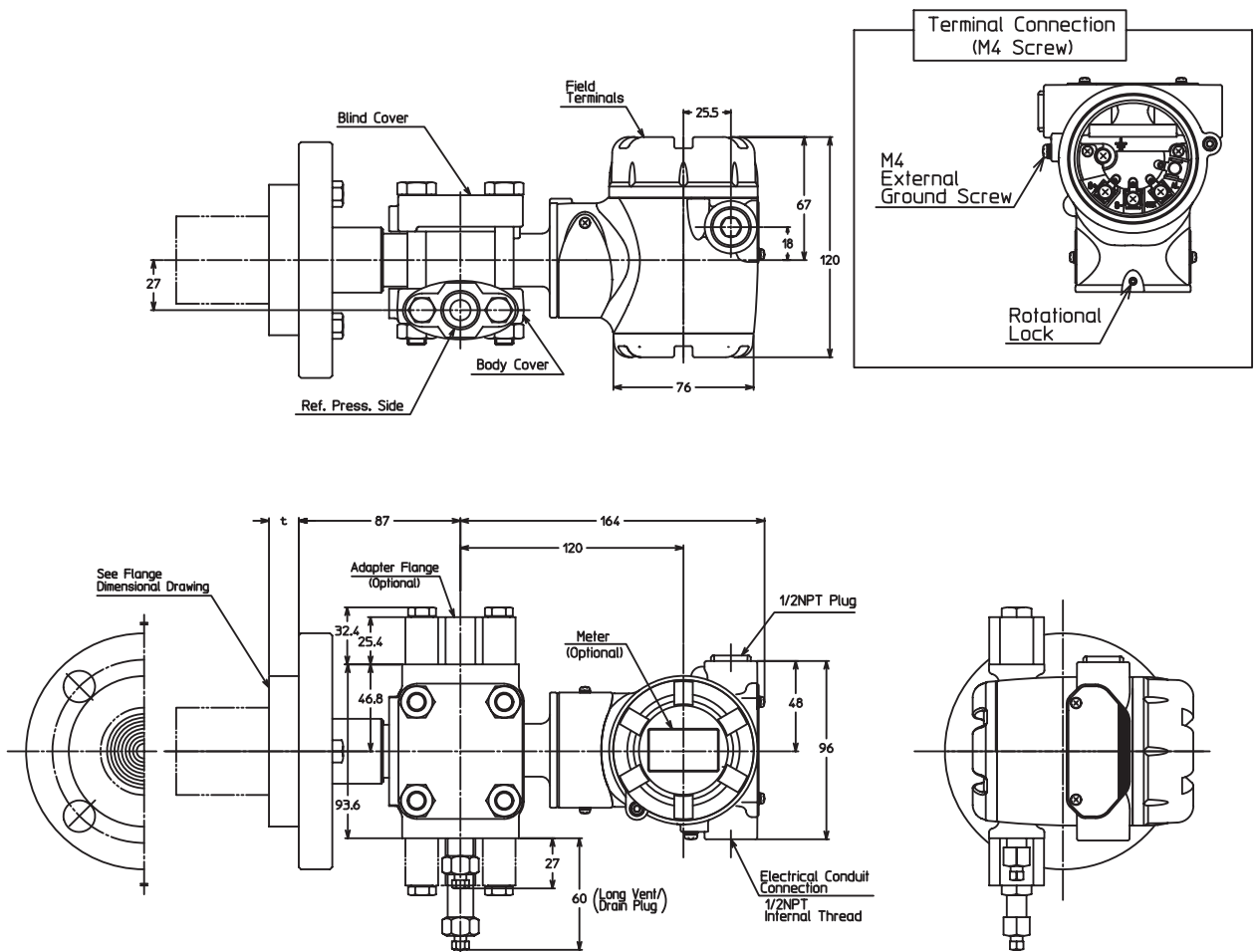
Options II	XX	No options
	A2	External Zero adjustment *11
	G4	Long vent/drain plugs
	K1	Oil and water free finish
	K3	Oil free finish *4
	L1	Au Plating Diaphragm *15
	M5	0.1mm thickness diaphragm *12*13
	N1	FEP protective film *14
	Q1	Safety Transmitter *5
	Q2	NAMUR NE43 Compliant Output signal limits:3.8 to 20.5mA (Output 21.6mA/selected upper limit, 3.6mA/selected lower limit)
	Q7	Alarm Output (contact output)
	R1	Custom calibration
	T1	Test report
	T2	Mill certificate
	T4	Traceability certificate
	T5	NACE certificate *9
	W1	Non SI Unit

- Note) \*4 No need to select when Fill Fluid code H, or J is selected.  
 \*5 Not applicable for the combination with code A2, or Q7 of Option.  
 \*9 Applicable for "ASTM B575", code B of Material (center body).  
 \*11 Not applicable for the combination with code X "None" of Indicator. Please select "With indicator".  
 \*12 0.1 mm thickness diaphragm option is only available for Material of Wetted parts: "316 SST" and "316L SST".  
 \*13 0.1 mm thickness diaphragm option is only available for 4inches Extended Flange or 3inches Flush Flange.  
 \*14 Not applicable for the combination with Extended Flange Type.  
 \*15 Not applicable for the combination with "Tantalum" of Material (center body).

**DIMENSIONS**

**Model GTX35F/60F**

(Unit : mm)



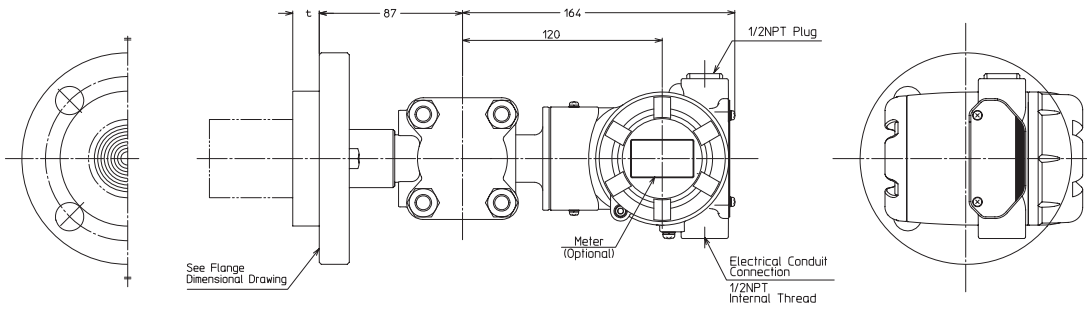
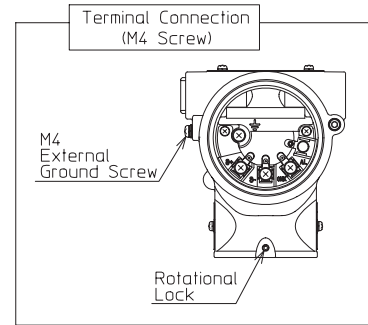
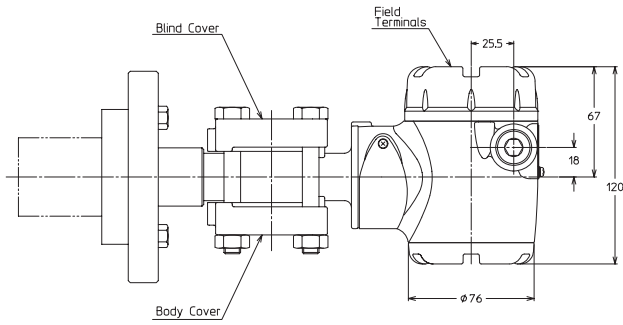
- Note) 1) For the process pipe connection on the standard pressure side, choose either the upward or downward directions. When changing the connection, replace the adapter flange and the vent/drain plugs.  
 2) Select a gasket that will not contact the diaphragm after it is tightened.

# Model GTX35F/60F

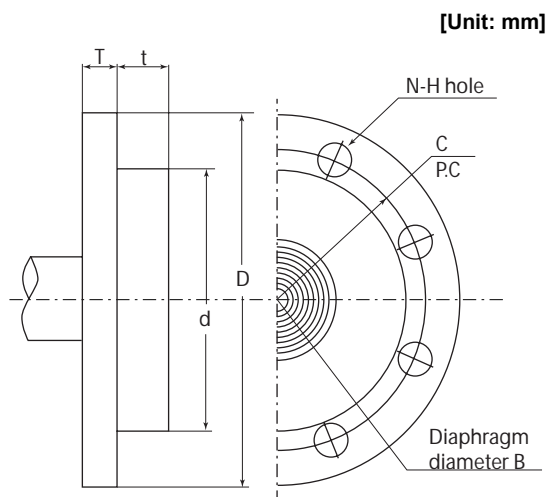
## Process connection of reference side: open to atmosphere

(Unit : mm)

Process Connection :



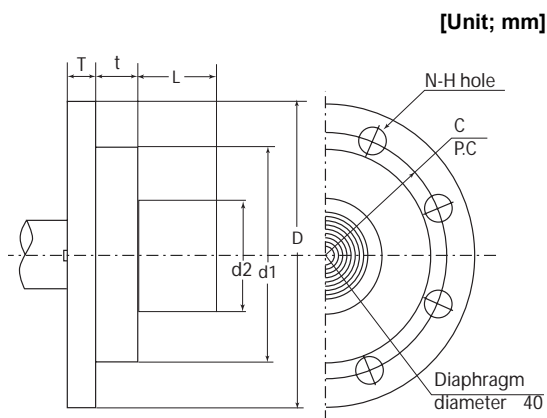
## Flash diaphragm flange



Material of wetted parts	B
316 SST	40
316L SST	
ASTM B575 (Hastelloy C-276 equivalent)	43
Tantalum	62

Rating	Flange rating	D	T	C	N	H	d	t
1.5 inch/ 40 mm	JIS 10K - 40 mm	140	18	105	4	19	81	16
	JIS 20K - 40 mm	140	18	105	4	19		
	JIS 30K - 40 mm	160	25	120	4	23		
	ANSI 150 - 1.5 inch	127	18	98.6	4	16		
	ANSI 300 - 1.5 inch	155	25	114.3	4	22		
	ANSI 600 - 1.5 inch	155	32	114.3	4	22		
	JPI 150 - 1.5 inch	127	18	98.6	4	16		
	JPI 300 - 1.5 inch	155	25	114.3	4	22		
2 inches/ 50 mm	JIS 10K - 50 mm	155	16	120	4	19	99	19
	JIS 20K - 50 mm	155	18	120	8	19		
	JIS 30K - 50 mm	165	22	130	8	19		
	ANSI 150 - 2 inches	152	19.5	120.6	4	19		
	ANSI 300 - 2 inches	165	22.5	127	8	19		
	ANSI 600 - 2 inches	165	25.5	127	8	19		
	JPI 150 - 2 inches	152	19.5	120.6	4	19		
	JPI 300 - 2 inches	165	22.5	127	8	19		
3 inches/ 80 mm	JIS 10K - 80 mm	185	18	150	8	19	129.5	22
	JIS 20K - 80 mm	200	22	160	8	23		
	JIS 30K - 80 mm	210	28	170	8	23		
	ANSI 150 - 3 inches	190	24	152.4	4	19		
	ANSI 300 - 3 inches	210	28.5	168.1	8	22		
	ANSI 600 - 3 inches	210	32	168.1	8	22		
	JPI 150 - 3 inches	190	24	152.4	4	19		
	JPI 300 - 3 inches	210	28.5	168.1	8	22		
JPI 600 - 3 inches	210	32	168.1	8	22			

## External diaphragm flange



Rating	Flange rating	D	T	C	N	H	d1	d2	t	B	L
2 inches/ 50 mm	JIS 10K - 50 mm	155	16	120	4	19	99	47±1	19		50
	JIS 20K - 50 mm	155	18	120	8	19					100
	JIS 30K - 50 mm	165	22	130	8	19					150
	ANSI 150 - 2 inches	152	19.5	120.6	4	19					200
	ANSI 300 - 2 inches	165	22.5	127	8	19					250
	ANSI 600 - 2 inches	165	25.5	127	8	19					300
	JPI 150 - 2 inches	152	19.5	120.6	4	19					
	JPI 300 - 2 inches	165	22.5	127	8	19					
	JPI 600 - 2 inches	165	25.5	127	8	19					
3 inches/ 80 mm	JIS 10K - 80 mm	185	18	150	8	19	129.5	69±1	22	40	
	JIS 20K - 80 mm	200	22	160	8	23					
	JIS 30K - 80 mm	210	28	170	8	23					
	ANSI 150 - 3 inches	190	24	152.4	4	19					
	ANSI 300 - 3 inches	210	28.5	168.1	8	22					
	ANSI 600 - 3 inches	210	32	168.1	8	22					
	JPI 150 - 3 inches	190	24	152.4	4	19					
	JPI 300 - 3 inches	210	28.5	168.1	8	22					
4 inches/ 100 mm	JIS 10K - 100 mm	210	18	175	8	19	157	95±1	23		
	JIS 20K - 100 mm	225	24	185	8	23					
	JIS 30K - 100 mm	240	32	195	8	25					
	ANSI 150 - 4 inches	229	24	190.5	8	19					
	ANSI 300 - 4 inches	254	32	200.2	8	22					
	JPI 150 - 4 inches	229	24	190.5	8	19					
JPI 300 - 4 inches	254	32	200.2	8	22						

Note

Note

*Specifications are subject to change without notice.*

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