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VK-A SERIES

MODEL VK-202A TRANSDUCER

INSTRUCTION MANUAL

SHINKAWA Sensor Technology, Inc.

For Use in Safety.....

Thank you for your using our VK-A Series Transducer.
SHINKAWA Sensor Technology applies strict quality control and inspections to ensure the high reliability of its products.
The VK-A Series Transducer Instruction Manual contains descriptive information , specifications, principle of operation, installation procedures and field wiring with monitor.
Please study contents of this manual and related manuals thoroughly before installing or operating the equipment, and keep it handy for future reference.

RELATED MANUALS

■ VM Series Monitor Instruction Manual

⚠ CAUTION

1. If insulation resistance (Megger) test is made on the signal cable between transducer and monitor, disconnect the cable from transducer and monitor.
   Be sure to discharge the charged electric load before connecting the cable to the transducer and monitor.
   If this caution is not adhered to, the transducer and monitor could be damaged.
2. The connector connecting the sensor cable and the extension cable shall be insulated with the attached insulation sleeve (transparent shrink tube) or fluoro resin insulation tape.
   The vinyl-insulating tape shall not be used, which may cause the wiring trouble in the case of the temperature more than 80°C.
3. Do not measure insulation resistance and dielectric strength other than those at places specified.
   If measured, transducer damage may result.
4. Before collecting data to check output characteristics, set gap, etc., warm up the transducer for more than 30 minutes to stabilize the output after the power is turned on.
5. Do not use radio transceiver or cellular phone near the equipment under the condition of opened Driver Housing, or uninstalled Sensor or Extension Cable for maintenance or the like. It may interfere in the output of the Driver.
6. Before suppling the power to the driver, make sure that the sensor, extension cable and driver are connected as a transducer system.
   Do not supply the power to the driver without connecting the sensor and extension cable.
7. Do not remodel this unit without permission. Otherwise the guarantee can not be made.
8. This unit is designed for use by specialists or persons thoroughly familiar with the field.
9. Make sure that the end user receives the Instruction Manual delivered with this unit.
10. Do not wipe off name plate with solvents, such as toluene and methanol. Characters may disappear.

Before Use.....

When the unit is received, inspect it for damage suffered in transport and check whether it is the item you ordered. In the unlikely event that it was damaged in transport or does not function according to specifications, please contact the SHINKAWA Office or dealer nearest you.
Store the unit under the ambient conditions given in the specification.
Avoid places where it is exposed to high humidity or corrosive gases.

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1. GENERAL INFORMATION

1.1 GENERAL

RIVERNEW Model VK-202A Transducer is the non-contact transducer system which consists of VL sensor, VW extension cable and VK driver.

This transducer system utilizes eddy currents and measures the gap between VL sensor and measured object (target) without physical contact and outputs voltage signal proportional to distance.

This transducer system offers 2,000μm (approx. 80mils) linear range for JIS SCM440 (AISI 4140 Steel) as a standard calibration material and is the most suitable system designed to measure high speed shaft vibration, eccentricity and thrust position.

Field wiring from driver to connecting instrument such as monitor generally uses 3-wire shielded cable and it can be extended up to 500m (max.)

2. SPECIFICATIONS

2.1 STANDARD SPECIFICATIONS

Model Code / Additional Spec. Code(No entry if additional spec. code is not specified.)

VK-202A □ /EX □ /SYS /GEO /CEM

System cable length		Intrinsically safe		System calibration*1	Geothermal spec.	CE marking
1	5m	1	TIIS (Ex ia IIC T6)			
2	9m	2	FM (IS/I,II,III/1/ABCDEFG/T4)			
		4	CSA C/US (Ex ia IIC T4)			
		5	ATEX (EEx ia IIC T4)			
		7	NEPSI (Ex ia IIC T4)			

*1 System calibration is not applicable for intrinsically safe specification.

*2 Above code shows model number of driver only. Refer to outline drawings for model number of sensor and extension cable.

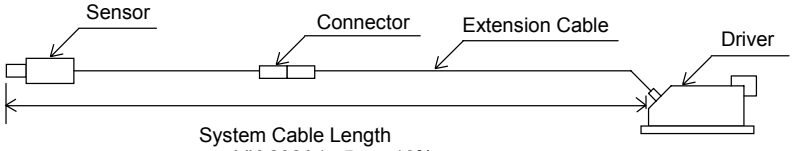
SPECIFICATIONS	
CALIBRATION MATERIAL	JIS SCM440 flat surface
LINEAR RANGE*3 (NOTE 1)	Over 2,000μm
SCALE FACTOR*3	787mV/100μm
SCALE FACTOR ERROR*3	Within ± 5% of 787mV/100μm (200mV/mil) (if calibrated as a system) Within ± 9% of 787mV/100μm (200mV/mil) (including interchangeability errors)
LINEARITY*3	Within ± 20μm of 787mV/100μm straight line (if calibrated as a system)
FREQUENCY RESPONSE*3	DC to 10kHz (-3dB) at 400μm pk-pk DC to 14kHz (-3dB) at 100μm pk-pk DC to 20kHz (-3dB) at 10μm pk-pk
MAX. OUTPUT VOLTAGE*3	Approx.-22.5VDC (at -24VDC power supply voltage)
OUTPUT IMPEDANCE*3	50Ω Current 5mA (max.)
CURRENT CONSUMPTION (10kΩ load)	Max. -15mA
OUTPUT NOISE*3	Approx. 15mVpk-pk - power supply noise
SENSOR TIP DIAMETER	Approx. 5mm or 8mm dia.
CABLE DIAMETER	Approx. 3.5mm dia.
CONNECTOR DIAMETER	Approx. 7.1mm dia.
SYSTEM CABLE LENGTH	5m ± 10% or 9m ± 10%
OPERATING TEMPERATURE RANGE	Sensor : -40 to +177°C Extension Cable : -40 to +177°C Driver : -38 to +80°C Connector : -40 to +125°C
RANGE OF TEMPERATURE AT EXPLOSION PROOF CONSTRUCTION	EX1,7 : -20 to +60°C (Sensor, Ext. Cable & Driver) EX2,4 : -20 to +85°C (Sensor, Ext. Cable & Driver) EX5 : -38 to +85°C (Sensor, Ext. Cable & Driver)
OPERATING HUMIDITY RANGE	30 to 95% RH (noncondensing, non-submerged)
POWER SUPPLY	-24VDC±10%
DIELECTRIC STRENGTH OF DRIVER	Between each terminal and insulator: 1mA or less at 500VAC for one minute
INSULATION RESISTANCE OF DRIVER	Between each terminal and insulator: 100MΩ or more at 500VDC
SCREWS OF TERMINAL BLOCK	M4
APPLICABLE WIRE GAUGE	0.75 to 2mm^2
*3 The above specifications apply at 25°C with -24VDC power supply and load resistance 10kΩ and JIS SCM440 target (thickness≥5mm).	
(NOTE 1) Linear range reduces when intrinsic safety system with barrier. (to approx. 95%)	

NOTICE

1. CALIBRATION MATERIAL
   MODEL VK-202A Transducers are calibrated for JIS SCM440 flat surface (more than 15mm dia.).
   If the measured target is other than JIS SCM440 flat surface, it will present a different characteristics. In such a case, calibration by the connected equipment (e.g. monitor) side should be required for system operation.
2. INSULATORS
   Prior to shipment, the insulators have been installed to the mounting holes of VK driver.
   Be sure to mount VK driver without removing insulators.
   Mounting without insulators could cause noise on driver output.
   Special caution to insulaters shall be paid for the intrinsic safety specification so that a system shall be earth grounded only at the barrier strip.
3. SHIELD WIRE CONNECTION
   Connect shield wire of signal cable (3-wire shielded cable between driver and monitor) to COM terminal.
   If this is not adhered to, noise may be caused.
4. CONNECTOR ISOLATION, etc.
   The connector connecting the sensor cable and the extension cable shall be insulated with the attached insulation sleeve (transparent shrink tube) or fluoro resin insulation tape.
   The vinyl-insulating tape shall not be used, which may cause the wiring trouble in the case of the temperature more than 80°C.
   The connector shall not be located in the oil environment.
   The oil penetration to cable through the connector may cause the sensitivity change, due to the change of the cable capacitance.
5. MEGGER TEST OF SIGNAL CABLE
   If megger test is made on the signal cable (3-wire shielded cable), be sure to discharge the charged electric load before connecting the cable to driver.
   If this caution is not adhered the driver could be damaged.
6. SENSOR INSTALLATION
   Not available for rain water at out door use.
   It may cause the sensitivity change and insulation down.
7. SAFETY BARRIER
   In case of the intrinsically safe specification, the approved following safety barrier is recommended.
   - MTL 796-

   Especially in the case of FM approval, don't be used except MTL796-.
8. CALIBRATED AS A SYSTEM
   The sensor, extension cable and driver, which are calibrated as a system, shall be connected with each serial No. as specified in the inspection test report. If this is not adheared the output characteristics may be out of specification.
9. The wire break is not detectable in case of use for the revolution measurement.

CONFIGURATION



System Cable Length
VK-202A1 : 5m ± 10%
VK-202A2 : 9m ± 10%

2. SPECIFICATIONS

Model Code / Additional Spec. Code(No entry if additional spec. code is not specified.)

VK-202A □ /EX □ SYS /GEO /CEM

System cable length		Intrinsically safe		System calibration*1	Geothermal spec.	CE marking
3	5m	4	CSA C/US (Ex ia IIC T4)			
4	9m	5	ATEX (EEx ia IIC T4)			
		7	NEPS (Ex ia IIC T4)			

*1 System calibration is not applicable for intrinsically safe specification.

*2 Above code shows model number of driver only. Refer to outline drawings for model number of sensor and extension cable.

SPECIFICATIONS

CALIBRATION MATERIAL*3	JIS SCM440 flat surface
LINEAR RANGE*3 (NOTE 1)	Over 2,000μm
SCALE FACTOR*3	787mV/100μm
SCALE FACTOR ERROR*3	Within ±5% of 787mV/100μm (200mV/mil) (if calibrated as a system) Within ±9% of 787mV/100μm (200mV/mil) (including interchangeability errors)
LINEARITY*3	Within ±20(m of 787mV/100(m straight line (if calibrated as a system)
FREQUENCY RESPONSE *3	DC to 10kHz (–3dB) at 400μm pk-pk DC to 14kHz (–3dB) at 100μm pk-pk DC to 20kHz (–3dB) at 10μm pk-pk
MAX. OUTPUT VOLTAGE *3	Approx.-22.5VDC (at -24VDC power supply voltage)
OUTPUT IMPEDANCE*3	50Ω Current 5mA (max.)
CURRENT CONSUMPTION (10kΩ load)	Max. -15mA
OUTPUT NOISE *3	Approx. 15mVpk-pk - power supply noise
SENSOR TIP DIAMETER	Approx. 5mm or 8mm dia.
CABLE DIAMETER	Approx. 3.5mm dia.
CONNECTOR DIAMETER	Approx. 7.1mm dia.
SYSTEM CABLE LENGTH	5m±10% or 9m±10%
OPERATING TEMPERATURE RANGE	Sensor : -40 to +177°C Extension Cable : -40 to +177°C Driver : -38 to +80°C Connector : -40 to +125°C
RANGE OF TEMPERATURE AT EXPLOSION PROOF CONSTRUCTION	EX7 : -20 to 60°C (Sensor, Ext. Cable & Driver) EX4 : -20 to 85°C (Sensor, Ext. Cable & Driver) EX5 : -38 to 85°C (Sensor, Ext. Cable & Driver)
OPERATING HUMIDITY RANGE	30 to 95% RH (noncondensing, non-submerged)
POWER SUPPLY	–24VDC±10%
DIELECTRIC STRENGTH OF DRIVER	Between each terminal and insulator: 1mA or less at 500VAC for one minute
INSULATION RESISTANCE OF DRIVER	Between each terminal and insulator: 100MΩ or more at 500VDC
SCREWS OF TERMINAL BLOCK	M4
APPLICABLE WIRE GAUGE	0.75 to 2mm^2

*3 The above specifications apply at 25°C with –24VDC power supply and load resistance 10kΩ and JIS SCM440 target (thickness≥5mm).

(Note1) Linear range reduces when intrinsic safety system with barrier. (to approx. 95%)

NOTICE

1. CALIBRATION MATERIAL
   MODEL VK-202A Transducers are calibrated for JIS SCM440 flat surface (more than 15mm dia.).
   If the measured target is other than JIS SCM440 flat surface, it will present a different characteristics. In such a case, calibration by the connected equipment (e.g. monitor) side should be required for system operation.
2. INSULATORS
   Prior to shipment, the insulators have been installed to the mounting holes of VK driver.
   Be sure to mount VK driver without removing insulators.
   Mounting without insulators could cause noise on driver output.
3. SHIELD WIRE CONNECTION
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   If this is not adhered to, noise may be caused.
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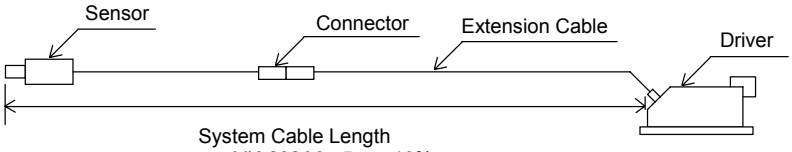
   The connector connecting the sensor cable and the extension cable shall be insulated with the attached insulation sleeve (transparent shrink tube) or fluoro resin insulation tape.
   The vinyl-insulating tape shall not be used, which may cause the wiring trouble in the case of the temperature more than 80°C.
   The connector shall not be located in the oil environment.
   The oil penetration to cable through the connector may cause the sensitivity change, due to the change of the cable capacitance.
5. MEGGER TEST OF SIGNAL CABLE
   If megger test is made on the signal cable (3-wire shielded cable), be sure to discharge the charged electric load before connecting the cable to driver.
   If this caution is not adhered the driver could be damaged.
6. SENSOR INSTALLATION
   Not available for rain water at out door use.
   It may cause the sensitivity change and insulation down.
7. SAFETY BARRIER
   In case of the intrinsically safe specification, the approved following safety barrier is recommended.
   - MTL 796-
8. CALIBRATED AS A SYSTEM
   The sensor, extension cable and driver, which are calibrated as a system, shall be connected with each serial No. as specified in the inspection test report. If this is not adheared the output characteristics may be out of specification.
9. The wire break is not detectable in case of use for the revolution measurement.

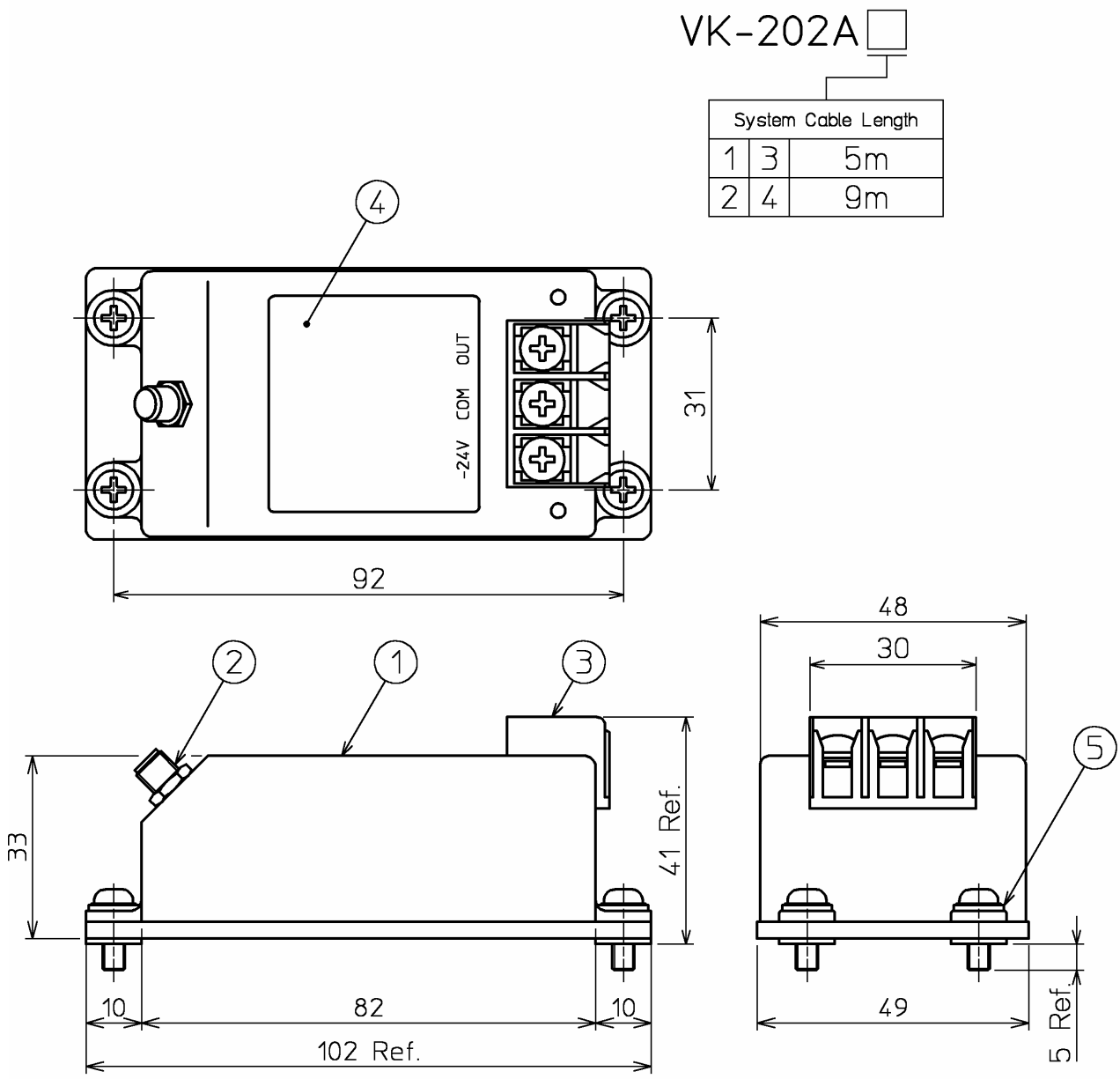
CONFIGURATION



System Cable Length
VK-202A3 : 5m ± 10%
VK-202A4 : 9m ± 10%

2.2 MODEL CODE AND OUTLINE DRAWING

2.2.1 VK DRIVER



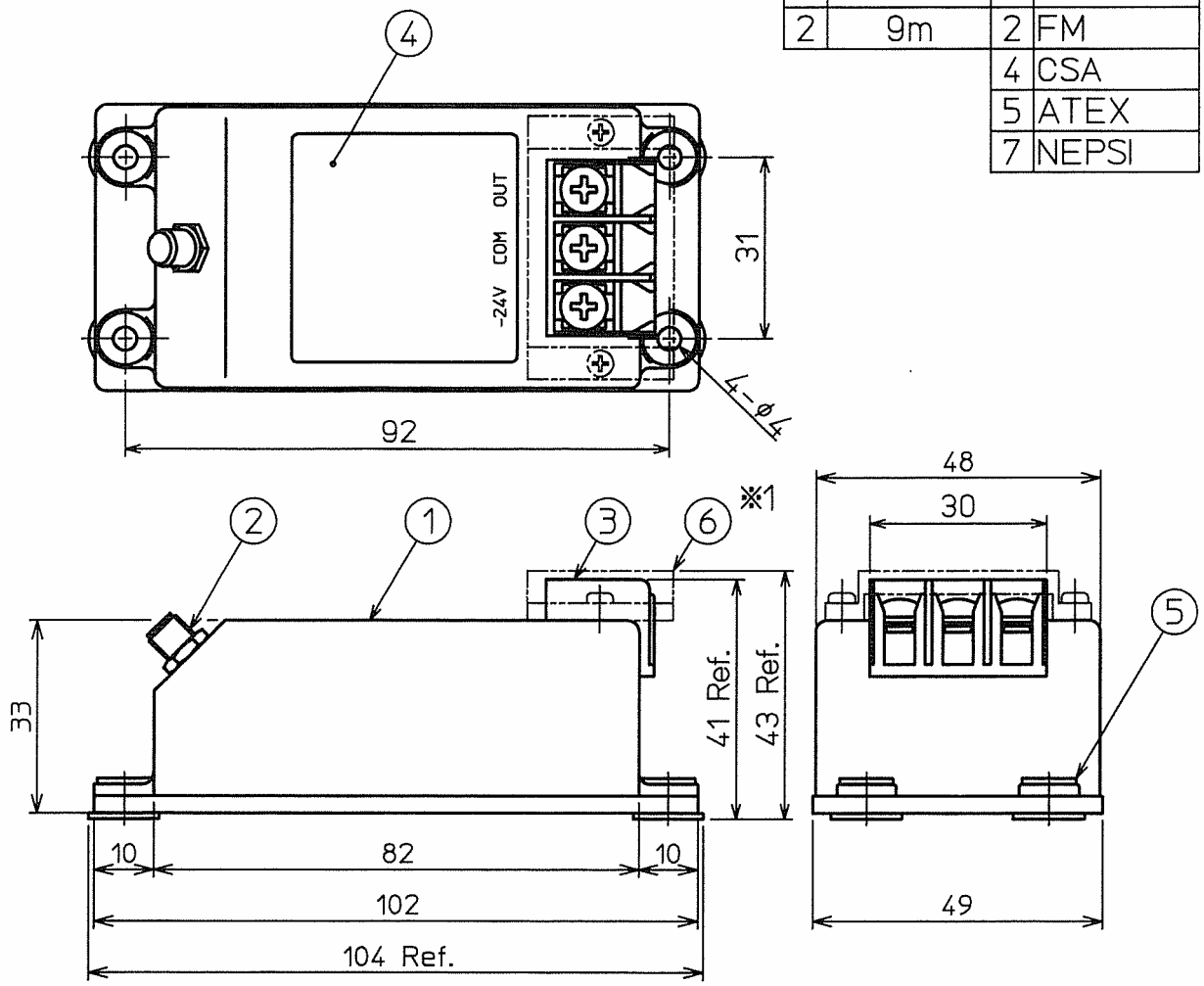
Dimensions: mm

No.	Name	Material	Quantity	Remark
1	Body	Aluminum	—	———
2	Coax. connector	———	—	———
3	Terminal block	———	—	M4 screw
4	Name plate	———	—	———
5	Insulators	———	4	With M4 screw

※1
In case of the intrinsically safe specification, the terminal cover must be installed after connecting the signal cable.

VK-202A□/EX□

System Cable Length		Intrinsic Safety	
1	5m	1	TIIS(IEC)
2	9m	2	FM
		4	CSA
		5	ATEX
		7	NEPSI



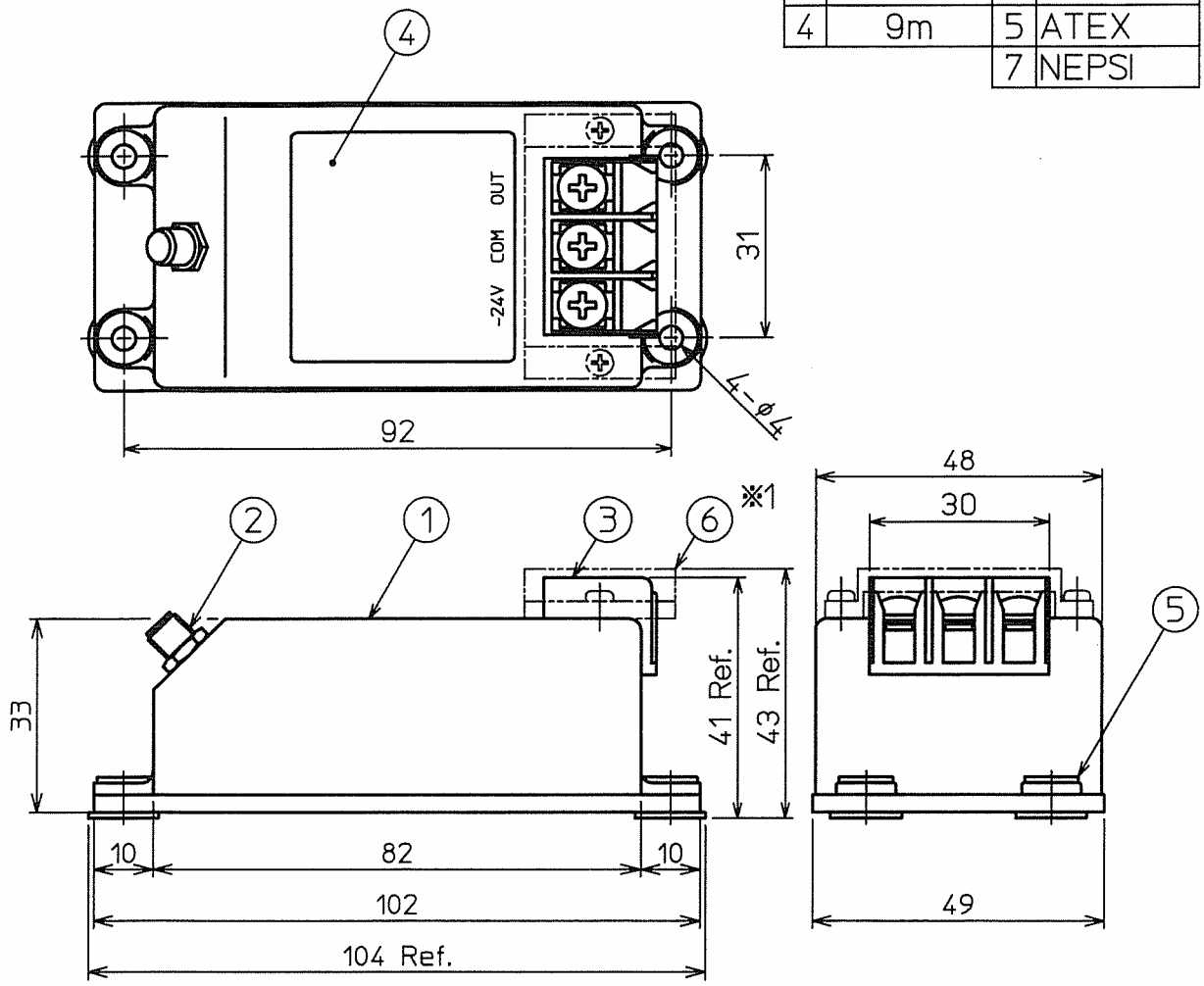
Dimensions: mm

No.	Name	Material	Quantity	Remark
1	Body	Aluminum	—	———
2	Coax. connector	———	—	———
3	Terminal block	———	—	M4 screw
4	Name plate	———	—	———
5	Insulators	———	4	———
6	Terminal cover	———	1	Fixed M2.6 screw

※1
In case of the intrinsically safe specification, the terminal cover must be installed after connecting the signal cable.

VK-202A□/EX□

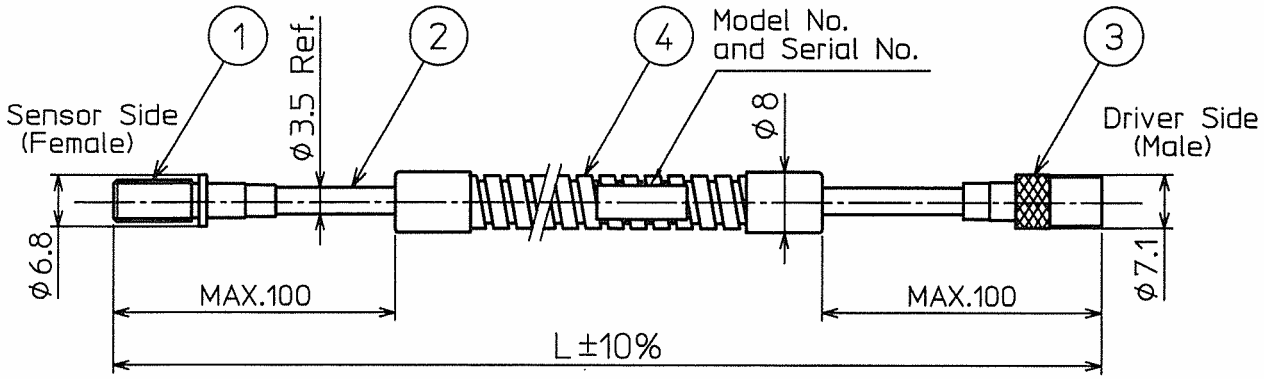
System Cable Length		Intrinsic Safety	
3	5m	4	CSA
4	9m	5	ATEX
		7	NEPSI



Dimensions: mm

No.	Name	Material	Quantity	Remark
1	Body	Aluminum	—	———
2	Coax. connector	———	—	———
3	Terminal block	———	—	M4 screw
4	Name plate	———	—	———
5	Insulators	———	4	———
6	Terminal cover	———	1	Fixed M2.6 screw

2.2.2 VW EXTENSION CABLE (Refer to "9. TABLE OF MODEL CODE")



VW-202AA-□/EX□

Cable Length (L)		Intrinsic Safety	
3	4.0m	1	TIIS(IEC)
4	4.5m	2	FM
8	8.0m	4	CSA
A	8.5m	5	ATEX
		7	NEPSI

(Electrical)

Previous Code

L

1

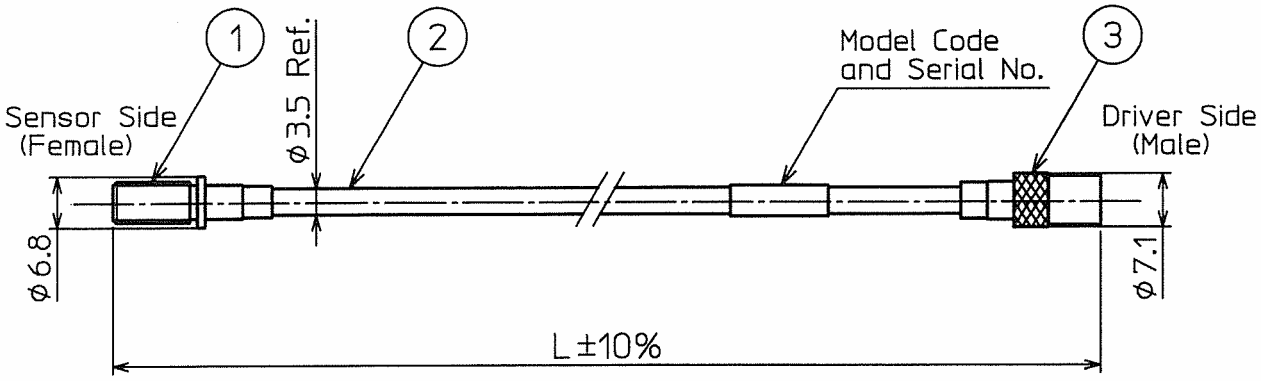
VW-□□□J/□□-CM-1

Cable Length (Electrical)	
402	4000 mm
452	4500 mm
802	8000 mm
852	8500 mm

Connector	
00	No Connector
CF	With Connector

Dimensions: mm

No.	Name	Material	Quantity	Remark
1	Coax. connector	————	——	————
2	Coax. cable	Fluoro resin	——	————
3	Coax. connector	————	——	————
4	Flexible armor	Stainless steel	——	————



VW-202AL-□/EX□

Cable Length (L)		Intrinsic Safety	
3	4.0m	1	TIIS(IEC)
4	4.5m	2	FM
8	8.0m	4	CSA
A	8.5m	5	ATEX
		7	NEPSI

(Electrical)

Previous Code

L

1

VW-□□□ J/□□-CM-0

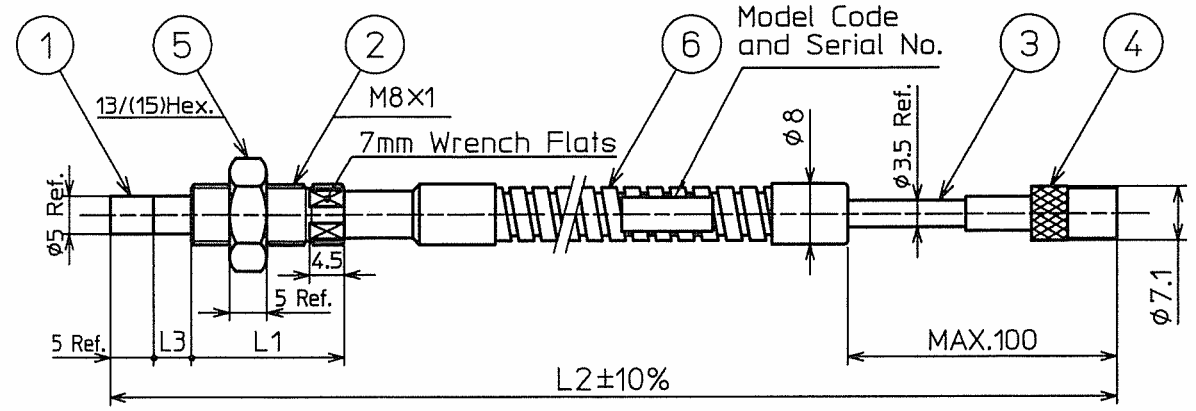
Cable Length (Electrical)	
402	4000 mm
452	4500 mm
802	8000 mm
852	8500 mm

Connector	
00	No Connector
CF	With Connector

Dimensions: mm

No.	Name	Material	Quantity	Remark
1	Coax. connector	———	———	———
2	Coax. cable	Fluoro resin	———	———
3	Coax. connector	———	———	———

2.2.3 VL SENSOR (Refer to "9. TABLE OF MODEL CODE")



VL-202A05A-[1][ ][ ][ ] /EX [ ]

Threaded Size		Unthreaded Length(L3)		Threaded Length(L1)		Cable Length(L2)※1		Intrinsic Safety	
1	M8×1	0	3mm	0	20mm	1	0.5m	1	TIIS(IEC)
2	1/4-28UNF			1	30mm	2	1.0m	2	FM
				2	40mm			4	CSA
				3	50mm	※1 Electrical		5	ATEX
								7	NEPSI

Previous Code

VL-05020L01/[ ][ ][ ][ ][ ][ ]-J[ ][ ][ ]-[ ][ ]-1 (L3, L1, L2, 4)

Unthreaded Length	
030	3mm (std.)
[ ][ ]×10[ ]=	mm
Min. Length ; 3mm	
Max. Length ;100mm	
L3+L1≦ 253mm	

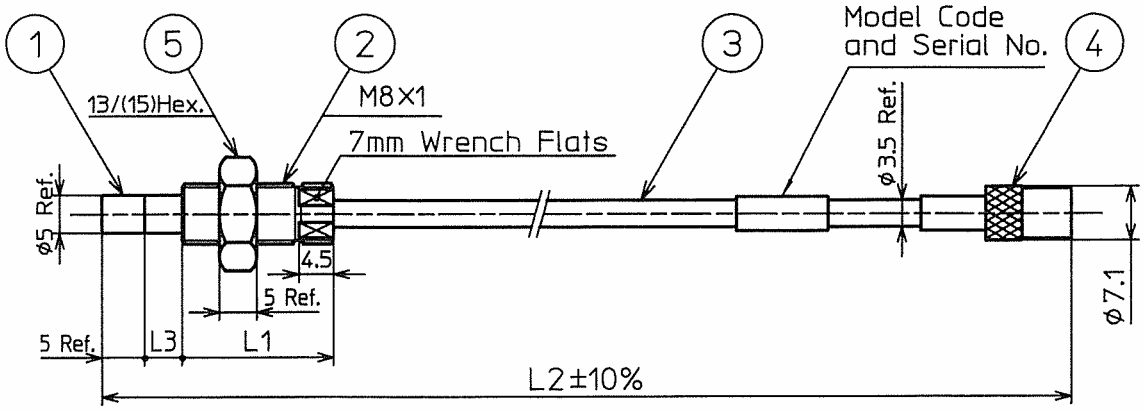
Threaded Length	
200	20mm (std.)
[ ][ ]×10[ ]=	mm
Min. Length ; 20mm	
Max. Length ;250mm	

Cable Length ※1	
501	500mm
102	1000mm

Connector	
00	No Connector
CM	With Connector

Dimensions: mm

No.	Name	Material	Quantity	Remark
1	Sensor tip	Resin	——	————
2	Threaded portion	Stainless steel	——	————
3	Coax. cable	Fluoro resin	——	————
4	Coax. connector	————	——	————
5	Jam nut	Stainless steel	1	————
6	Flexible armor	Stainless steel	——	————



VL-202A05L- 1□□□ /EX □

Threaded Size		Unthreaded Length(L3)		Threaded Length(L1)		Cable Length(L2)※1		Intrinsic Safety	
1	M8X1	0	3mm	0	20mm	1	0.5m	1	TIIS(IEC)
2	1/4-28UNF			1	30mm	2	1.0m	2	FM
				2	40mm			4	CSA
				3	50mm	※1 Electrical		5	ATEX
								7	NEPSI

Previous Code

VL-05020L01/ □□□□□□ -J□□□-□□-0 (L3 L1 L2 4)

Unthreaded Length	
030	3mm (std.)
□□X10□=	mm
Min. Length ; 3mm	
Max. Length ;100mm	
L3+L1≦ 253mm	

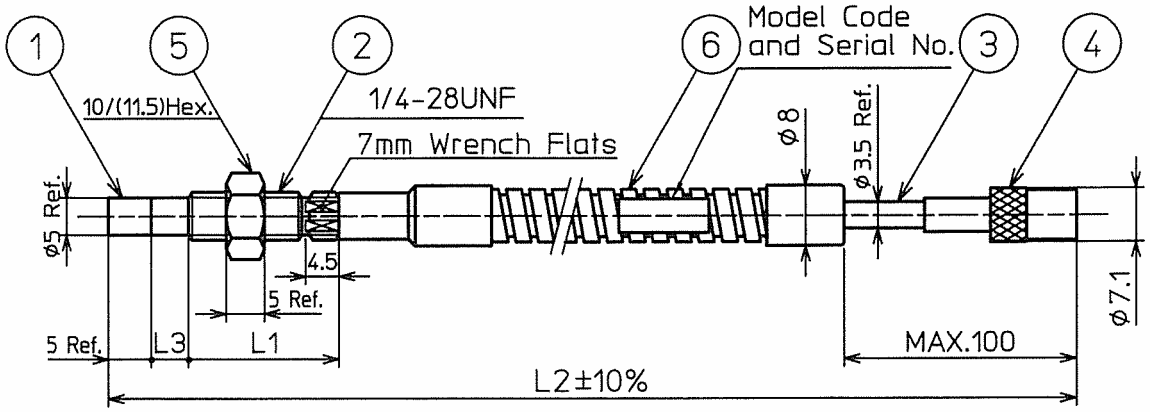
Threaded Length	
200	20mm (std.)
□□X10□=	mm
Min. Length ; 20mm	
Max. Length ;250mm	

Cable Length ※1	
501	500mm
102	1000mm

Connector	
00	No Connector
CM	With Connector

Dimensions: mm

No.	Name	Material	Quantity	Remark
1	Sensor tip	Resin	——	————
2	Threaded portion	Stainless steel	——	————
3	Coax. cable	Fluoro resin	——	————
4	Coax. connector	————	——	————
5	Jam nut	Stainless steel	1	————



VL-202A05A- 2□□□ /EX □

Threaded Size		Unthreaded Length(L3)		Threaded Length(L1)		Cable Length(L2)※1		Intrinsic Safety	
1	M8X1	0	3mm	0	20mm	1	0.5m	1	TIIS(IEC)
2	1/4-28UNF			1	30mm	2	1.0m	2	FM
				2	40mm			4	CSA
				3	50mm	※1 Electrical		5	ATEX
								7	NEPSI

Previous Code

VL-05020L02/ □□□□□□ -J □□□ - □□ -1 (L3, L1, L2, 4)

Unthreaded Length	
030	3mm (std.)
□□X10□=	mm
L3+L1≦100mm	

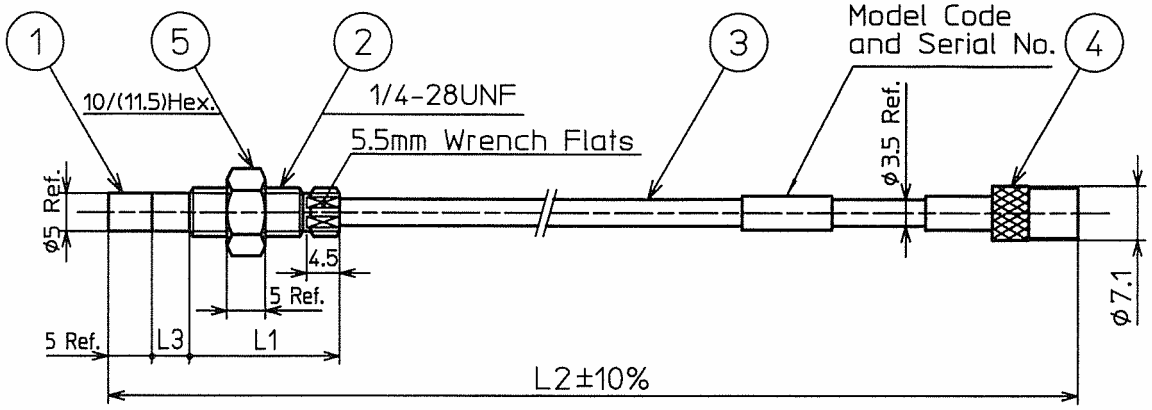
Threaded Length	
200	20mm (std.)
□□X10□=	mm
Min. Length ; 20mm	
Max. Length ; 97mm	

Cable Length ※1	
501	500mm
102	1000mm

Connector	
00	No Connector
CM	With Connector

Dimensions: mm

No.	Name	Material	Quantity	Remark
1	Sensor tip	Resin	——	————
2	Threaded portion	Stainless steel	——	————
3	Coax. cable	Fluoro resin	——	————
4	Coax. connector	————	——	————
5	Jam nut	Stainless steel	1	————
6	Flexible armor	Stainless steel	——	————



VL-202A05L- 2□□□ /EX □

Threaded Size		Unthreaded Length(L3)		Threaded Length(L1)		Cable Length(L2)※1		Intrinsic Safety	
1	M8X1	0	3mm	0	20mm	1	0.5m	1	TIIS(IEC)
2	1/4-28UNF			1	30mm	2	1.0m	2	FM
				2	40mm			4	CSA
				3	50mm	※1 Electrical		5	ATEX
								7	NEPSI

Previous Code

VL-05020L02/ □□□□□□ -J□□□-□□-0 (L3 L1 L2 4)

Unthreaded Length	
030	3mm (std.)
□□X10□=	mm
L3+L1≦100mm	

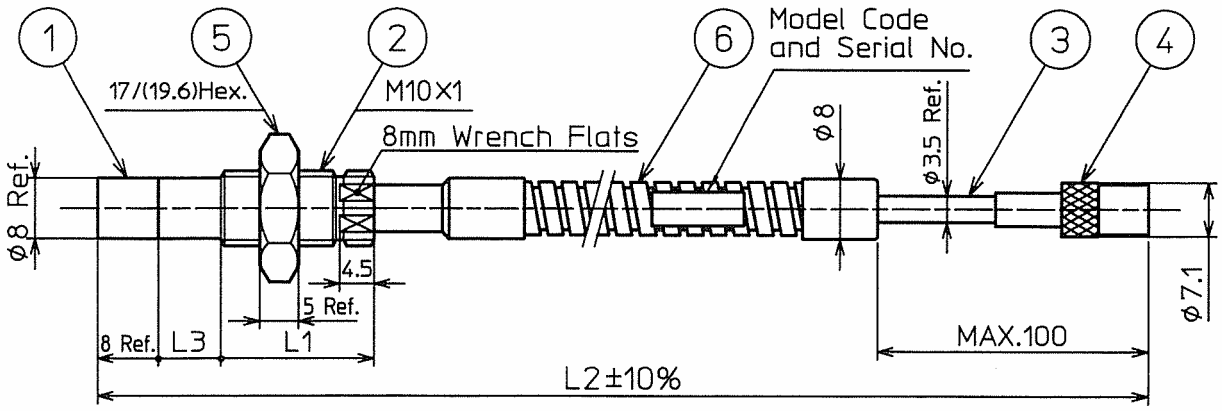
Threaded Length	
200	20mm (std.)
□□X10□=	mm
Min. Length ; 20mm	
Max. Length ; 97mm	

Cable Length ※1	
501	500mm
102	1000mm

Connector	
00	No Connector
CM	With Connector

Dimensions: mm

No.	Name	Material	Quantity	Remark
1	Sensor tip	Resin	——	——
2	Threaded portion	Stainless steel	——	——
3	Coax. cable	Fluoro resin	——	——
4	Coax. connector	——	——	——
5	Jam nut	Stainless steel	1	——



VL-202A08A-□□□□ /EX □

Threaded Size		Unthreaded Length(L3)		Threaded Length(L1)		Cable Length(L2)※1		Intrinsic Safety	
1	M10X1	0	0mm	0	20mm	1	0.5m	1	TIIS(IEC)
2	3/8-24UNF			1	30mm	2	1.0m	2	FM
				2	40mm			4	CSA
				3	50mm	※1 Electrical		5	ATEX
								7	NEPSI

Previous Code

VL-08020L01/□□□□□□-J□□□-□□-1 (L3, L1, L2, 4)

Unthreaded Length	
000	0mm (std.)
□□X10□=	mm
Min. Length ; 0mm	
Max. Length ;100mm	
L3+L1≦ 250mm	

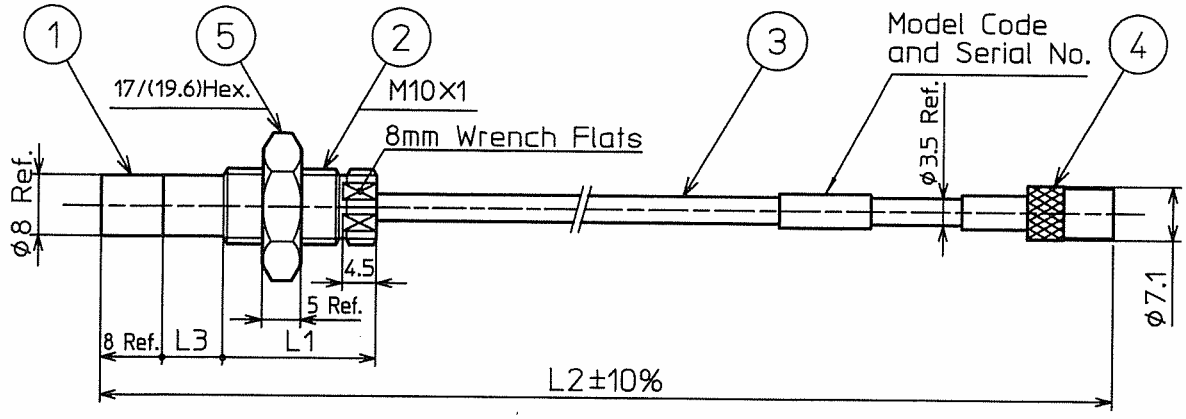
Threaded Length	
200	20mm (std.)
□□X10□=	mm
Min. Length ; 20mm	
Max. Length ;250mm	

Cable Length ※1	
501	500mm
102	1000mm

Connector	
00	No Connector
CM	With Connector

Dimensions: mm

No.	Name	Material	Quantity	Remark
1	Sensor tip	Resin	——	————
2	Threaded portion	Stainless steel	——	————
3	Coax. cable	Fluoro resin	——	————
4	Coax. connector	————	——	————
5	Jam nut	Stainless steel	1	————
6	Flexible armor	Stainless steel	——	————



VL-202A08L- 1□□□ /EX □

Threaded Size		Unthreaded Length(L3)		Threaded Length(L1)		Cable Length(L2)※1		Intrinsic Safety	
1	M10X1	0	0mm	0	20mm	1	0.5m	1	TIIS(IEC)
2	3/8-24UNF			1	30mm	2	1.0m	2	FM
				2	40mm			4	CSA
				3	50mm	※1 Electrical		5	ATEX
								7	NEPSI

Previous Code

VL-08020L01/ □□□□□□(L3 L1) -J□□□(L2) -□□(4) -0

Unthreaded Length	
000	0mm (std.)
□□X10□=	mm
Min. Length ; 0mm	
Max. Length ;100mm	
L3+L1≦ 250mm	

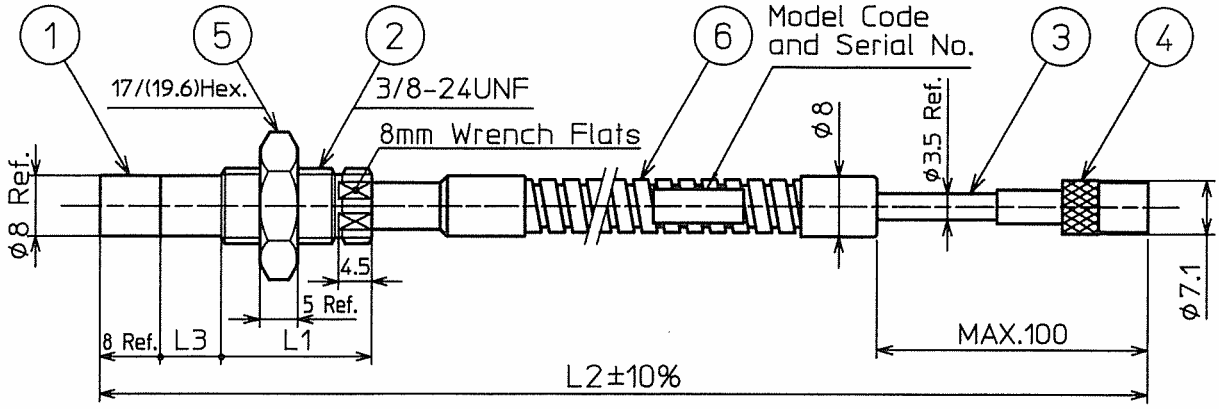
Threaded Length	
200	20mm (std.)
□□X10□=	mm
Min. Length ; 20mm	
Max. Length ;250mm	

Cable Length ※1	
501	500mm
102	1000mm

Connector	
00	No Connector
CM	With Connector

Dimensions: mm

No.	Name	Material	Quantity	Remark
1	Sensor tip	Resin	——	——
2	Threaded portion	Stainless steel	——	——
3	Coax. cable	Fluoro resin	——	——
4	Coax. connector	——	——	——
5	Jam nut	Stainless steel	1	——



VL-202A08A- 2 □□□ /EX □

Threaded Size		Unthreaded Length(L3)		Threaded Length(L1)		Cable Length(L2)※1		Intrinsic Safety	
1	M10X1	0	0mm	0	20mm	1	0.5m	1	TIIS(IEC)
2	3/8-24UNF			1	30mm	2	1.0m	2	FM
				2	40mm			4	CSA
				3	50mm	※1 Electrical		5	ATEX
								7	NEPSI

Previous Code

VL-08020L02/ □□□□□□ (L3 L1) -J□□□ (L2) -□□ (4) -1

Unthreaded Length	
000	0mm (std.)
□□ X10 □ =	mm
Min. Length ; 0mm	
Max. Length ;100mm	
L3+L1 ≦ 250mm	

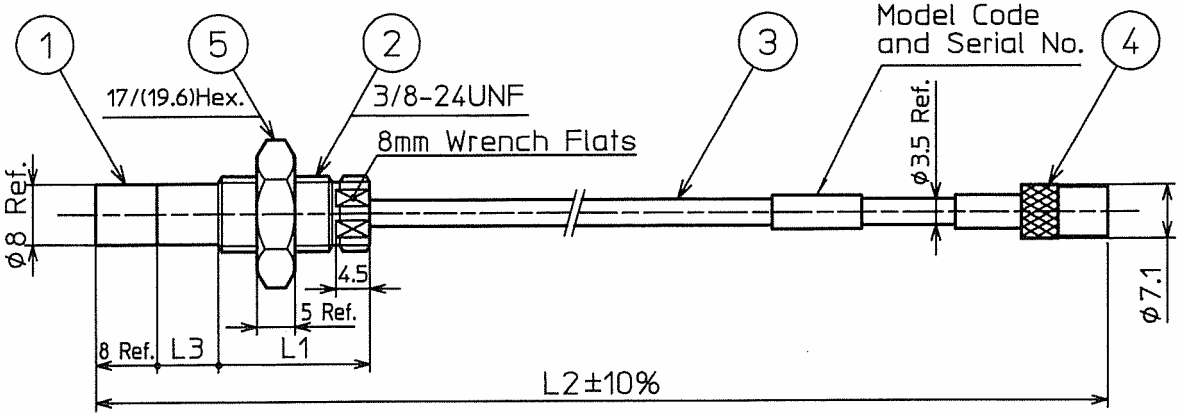
Threaded Length	
200	20mm (std.)
□□ X10 □ =	mm
Min. Length ; 20mm	
Max. Length ;250mm	

Cable Length ※1	
501	500mm
102	1000mm

Connector	
00	No Connector
CM	With Connector

Dimensions: mm

No.	Name	Material	Quantity	Remark
1	Sensor tip	Resin	——	——
2	Threaded portion	Stainless steel	——	——
3	Coax. cable	Fluoro resin	——	——
4	Coax. connector	——	——	——
5	Jam nut	Stainless steel	1	——
6	Flexible armor	Stainless steel	——	——



VL-202A08L- 2□□□ /EX □

Threaded Size		Unthreaded Length(L3)		Threaded Length(L1)		Cable Length(L2)※1		Intrinsic Safety	
1	M10X1	0	0mm	0	20mm	1	0.5m	1	TIIS(IEC)
2	3/8-24UNF			1	30mm	2	1.0m	2	FM
				2	40mm			4	CSA
				3	50mm	※1 Electrical		5	ATEX
								7	NEPSI

Previous Code

VL-08020L02/ □□□□□□ (L3 L1) -J□□□ (L2) -□□ (4) -0

Unthreaded Length	
000	0mm (std.)
□□ X10□ =	mm
Min. Length ; 0mm	
Max. Length ;100mm	
L3+L1≦ 250mm	

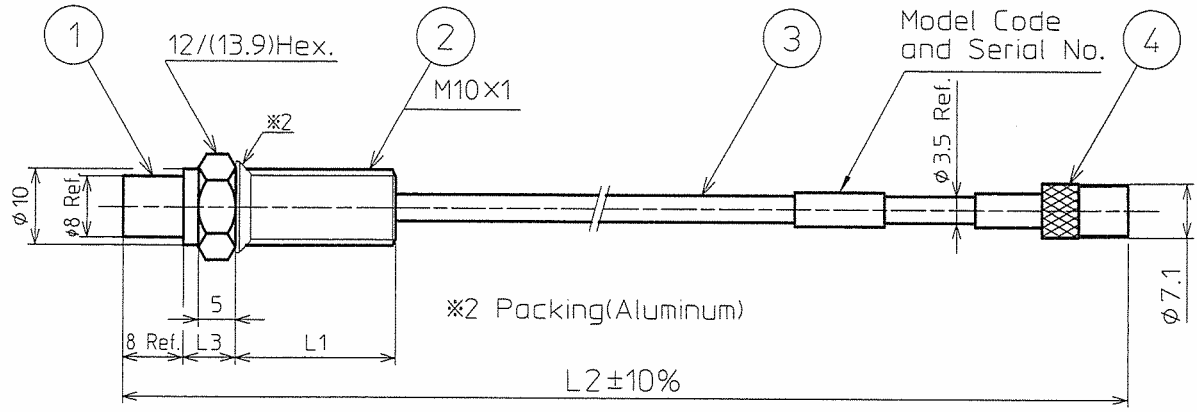
Threaded Length	
200	20mm (std.)
□□ X10□ =	mm
Min. Length ; 20mm	
Max. Length ;250mm	

Cable Length ※1	
501	500mm
102	1000mm

Connector	
00	No Connector
CM	With Connector

Dimensions: mm

No.	Name	Material	Quantity	Remark
1	Sensor tip	Resin	——	————
2	Threaded portion	Stainless steel	——	————
3	Coax. cable	Fluoro resin	——	————
4	Coax. connector	————	——	————
5	Jam nut	Stainless steel	1	————



VL-202A08R- 1□□□ /EX □

Threaded Size		Unthreaded Length(L3)		Threaded Length(L1)		Cable Length(L2)※1		Intrinsic Safety	
1	M10×1	0	7mm	0	20mm	1	0.5m	1	TIIS(IEC)
2	3/8-24UNF			1	30mm	2	1.0m	2	FM
				2	40mm			4	CSA
				3	50mm	※1 Electrical		5	ATEX
								7	NEPSI

Previous Code

VL-08020L03/ □□□□□□-J□□□-□□-0 (L3, L1, L2, 4)

Unthreaded Length	
070	7mm (std.)
□□×10□=	mm
Min. Length ; 5mm	
Max. Length ;100mm	
L3+L1≦ 255mm	

Threaded Length	
200	20mm (std.)
□□×10□=	mm
Min. Length ; 20mm	
Max. Length ;250mm	

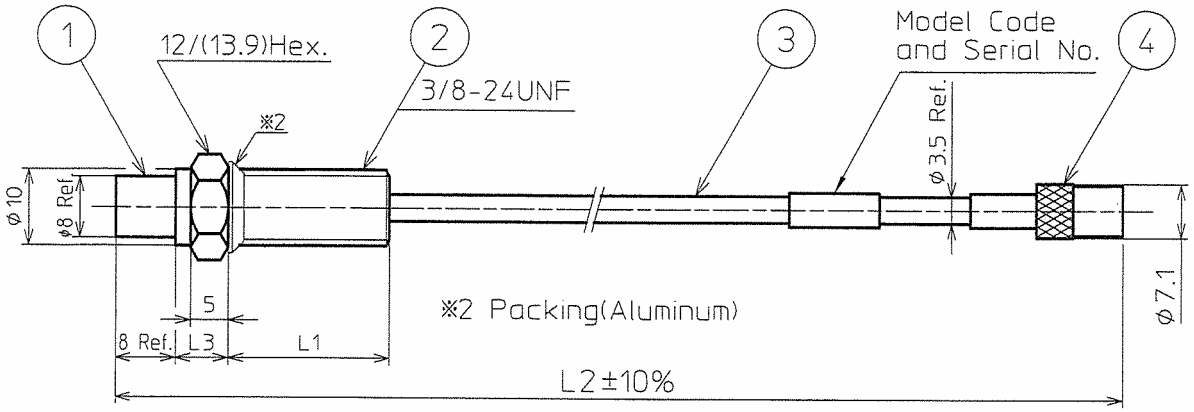
Cable Length ※1	
501	500mm
102	1000mm

Connector	
00	No Connector
CM	With Connector

NOTE)
Install the packing(※2) to the sensor, when sensor sleeve(VZ-10A-1) is used.

Dimensions: mm

No.	Name	Material	Quantity	Remark
1	Sensor tip	Resin	——	————
2	Threaded portion	Stainless steel	——	————
3	Coax. cable	Fluoro resin	——	————
4	Coax. connector	————	——	————



VL-202A08R- 2□□□ /EX □

Threaded Size		Unthreaded Length(L3)		Threaded Length(L1)		Cable Length(L2)※1		Intrinsic Safety	
1	M10X1	0	7mm	0	20mm	1	0.5m	1	TIIS(IEC)
2	3/8-24UNF			1	30mm	2	1.0m	2	FM
				2	40mm			4	CSA
				3	50mm	※1 Electrical		5	ATEX
								7	NEPSI

Previous Code

VL-08020L04/□□□□□□-J□□□-□□-0 (L3, L1, L2, 4)

Unthreaded Length	
070	7mm (std.)
□□X10□=	mm
Min. Length ; 5mm	
Max. Length ;100mm	
L3+L1≦ 255mm	

Threaded Length	
200	20mm (std.)
□□X10□=	mm
Min. Length ; 20mm	
Max. Length ;250mm	

Cable Length ※1	
501	500mm
102	1000mm

Connector	
00	No Connector
CM	With Connector

NOTE)
install the packing(※2) to the sensor, when sensor sleeve(VZ-10A-2) is used.

Dimensions: mm

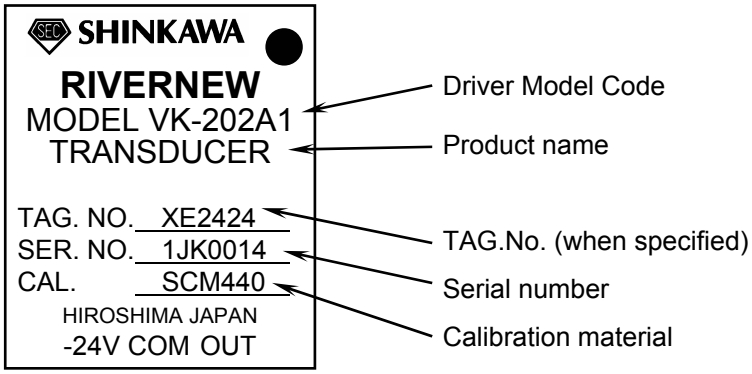
No.	Name	Material	Quantity	Remark
1	Sensor tip	Resin	——	————
2	Threaded portion	Stainless steel	——	————
3	Coax. cable	Fluoro resin	——	————
4	Coax. connector	————	——	————

2.3 NAME PLATE

Followings show the example.

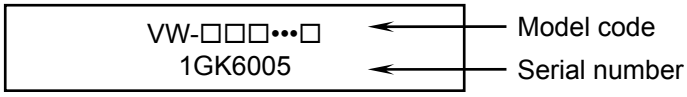
2.3.1 VK DRIVER NAME PLATE

VK driver name plate is installed on upper side of VK driver.



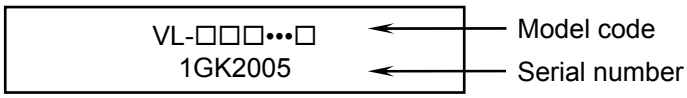
2.3.2 VW EXTENSION CABLE NAME PLATE

Model code number and serial number plate is installed on the cable or flexible armor, and protected with fluoro resin tube.



2.3.3 VL SENSOR NAME PLATE

Model code number and serial number plate is installed on the cable or flexible armor, and protected with fluoro resin tube.



3. PRINCIPLE OF OPERATION

3.1 GENERAL

Fig.3-1 below shows a block diagram of this vibration transducer. It is a non-contact type vibration transducer applying an eddy current. And a high frequency signal of about 1MHz is supplied to the sensor from an oscillator in the driver.

Thus, the sensor generates high frequency magnetic field so that eddy current flows in the target (observed material).

The eddy current in the target induces magnetic field, resulting in sensor impedance change according to the gap between the sensor and the target.

Thus, knowing the sensor impedance leads to obtain the gap.

The oscillator output is detected and the voltage output linearized with respect to the gap is output from the linearizer.

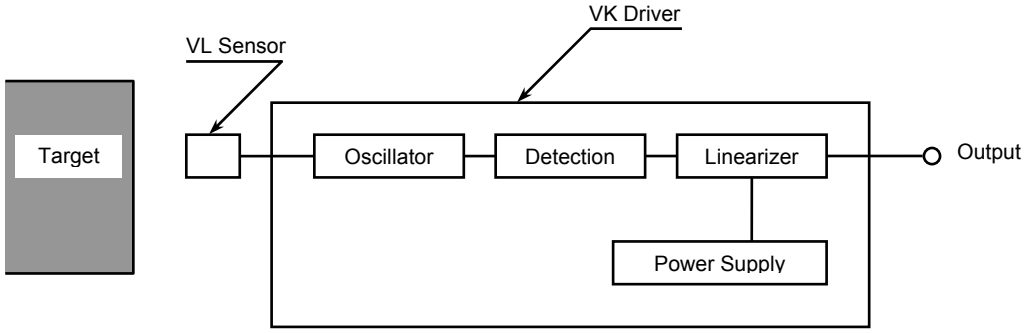


FIG. 3-1

4. INSTALLATION

4.1 RECEIVING INSPECTION

Visually inspect the transducer system for obvious shipping damage. If shipping damage is apparent, file a claim with the carrier and submit a copy to SHINKAWA Electric Co., Ltd.

4.2 STORING

The VK transducer system should be stored in a clean dry environment.

4.3 INSTALLATION

⚠ CAUTION

1. CALIBRATION MATERIAL
   MODEL VK-202A Transducers are calibrated for JIS SCM440 flat surface (more than 15mm dia.). If the measured target is other than JIS SCM440 flat surface, it will present a different characteristics. In such a case, calibration by the connected equipment (e.g. monitor) side should be required for system operation.
2. INSULATORS
   Prior to shipment, the insulators have been installed to the mounting holes of VK driver. Be sure to mount VK driver without removing insulators. Mounting without insulators could cause noise on driver output.
3. SHIELD WIRE CONNECTION
   Connect shield wire of signal cable (3-wire shielded cable between driver and monitor) to COM terminal. If this is not adhered to, noise may be caused.
4. CONNECTOR ISOLATION, etc.
   The connector connecting the sensor cable and the extension cable shall be insulated with the attached insulation sleeve (transparent shrink tube) or fluoro resin insulation tape.
   The vinyl-insulating tape shall not be used, which may cause the wiring trouble in the case of the temperature more than 80°C. The connector shall not be located in the oil environment. The oil penetration to cable through the connector may cause the sensitivity change, due to the change of the cable capacitance.
5. MEGGER TEST OF SIGNAL CABLE
   If megger test is made on the signal cable (3-wire shielded cable), be sure to discharge the charged electric load before connecting the cable to driver.
   If this caution is not adhered the driver could be damaged.
6. SENSOR INSTALLATION
   Not available for rain water at out door use. It may cause the sensitivity change and insulation down.
7. CALIBRATED AS A SYSTEM
   The sensor, extension cable and driver, which are calibrated as a system, shall be connected with each serial No. as specified in the inspection test report. If this is not adheared the output characteristics may be out of specification.
8. The wire break is not detectable in case of use for the revolution measurement.

⚠ CAUTION

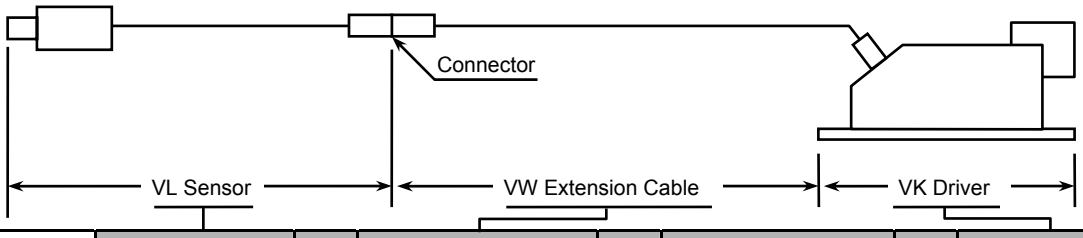
Keep defend tightening torque of under table without fail, in the case that the VL sensor attaches to the installation brackets or sensor-sleeve. Failure to observe this precaution could result in equipment damage.

SENSOR MODEL NO.	TIGHTENING TORQUE(NUT)
VL-202A05□-1□□□□	3.9N•m (40kg•cm REF.)
VL-202A05□-2□□□□	1.0N•m (10kg•cm REF.)
VL-202A08□-1□□□□	9.8N•m (100kg•cm REF.)
VL-202A08□-2□□□□	7.8N•m (80kg•cm REF.)

4.3.1 SYSTEM COMBINATION

⚠ CAUTION

1. The sensor, extension cable and driver, which are calibrated as a system at the manufacturer, shall be connected with each serial No. as specified in the inspection test report. If this is not adhered the output characteristics may be out of specification.
2. If the sensor and driver are connected without the extension cable, the output will differ from the specification greatly.



e.g.)

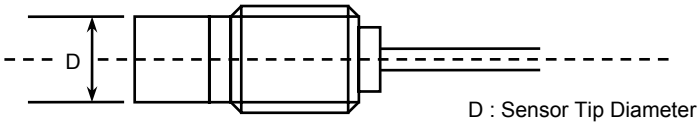
	VL SENSOR		VW EXTENSION CABLE		SYSTEM CABLE LENGTH		VK DRIVER
VK-202A SYSTEM COMBINATION	0.5m	+	4.5m	=	5m	→	VK-202A1
	1.0m	+	4.0m	=	5m	→	VK-202A3
	0.5m	+	8.5m	=	9m	→	VK-202A2
	1.0m	+	8.0m	=	9m	→	VK-202A4

4.3.2 SENSOR INSTALLATION CONSIDERATIONS

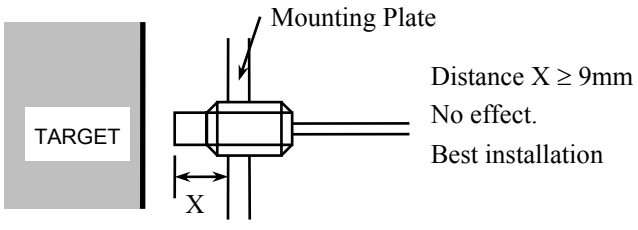
⚠ CAUTION

The existence of other metals than the target near the installed sensor and/or inadequate sensor installing position may impede correct measurement.
Following are sensor installation and installing effect.

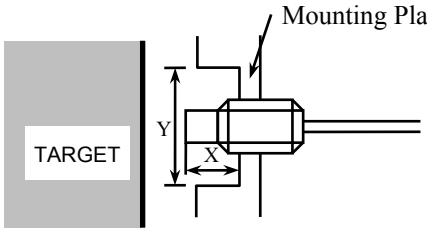
Figures are different from the actual shape.



a)

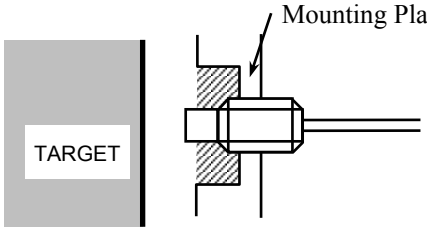


b)



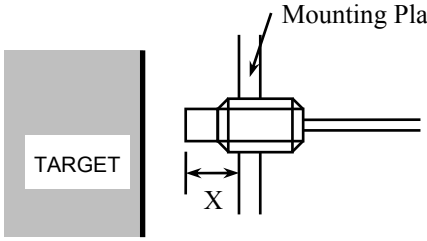
Distance X ≥ 9mm
Y> 3 times the sensor tip diameter
No effect.

c)



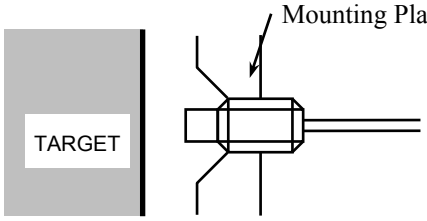
Same as b). An insulating material such as resin is filled into the slanted line section.
No effect.

d)



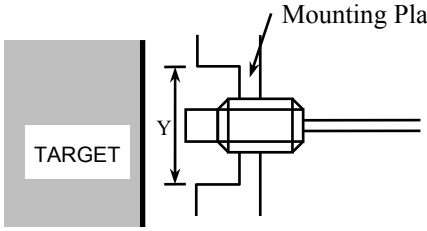
Distance X<9mm
There is effect.

e)



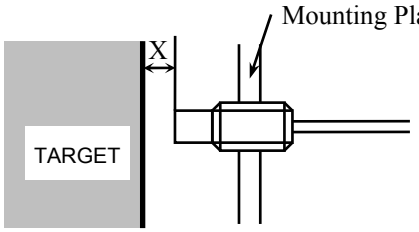
When the sensor neighborhood is countersunk.
There is effect.

f)



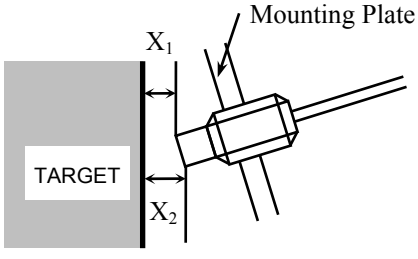
Y< 3 times the sensor tip diameter
There is effect.

g)



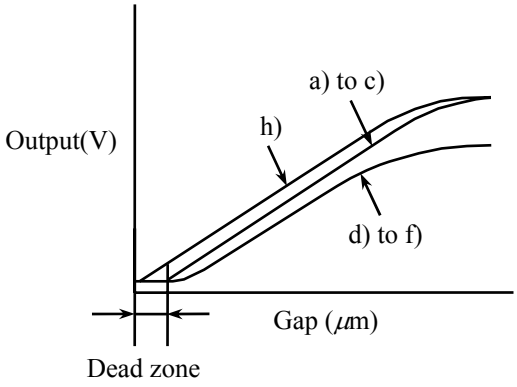
Gap X ≤ 0.3mm
Maker dead zone therefore can't measure.

h)



Gap $X_1 \neq$ Gap X_2
There is effect.

The installing effect are as shown below.



As the above results show, it is most preferable to install the sensor as shown in a) to c). However if the sensor is required to be installed as shown in d) to f), calibration in installed conditions is necessary.

Also, the dead zone as shown in the above should be noted.

⚠ CAUTION

The following conditions must be met to ensure accurate vibration detection.

1. The target surface must be more than 3 times the sensor tip diameter(Fig. 4.1(a)).
2. There must not be any conductive materials within a range of 3 times the sensor tip diameter (Fig. 4.1(b)).
3. To avoid mutual interference between sensors, a minimum distance corresponding to 10 times the sensor tip diameter must be maintained between sensors (Fig. 4.1(c)).
4. Use a sufficiently rigid installation method to prevent vibration of the sensor itself (Fig. 4.1(d)).

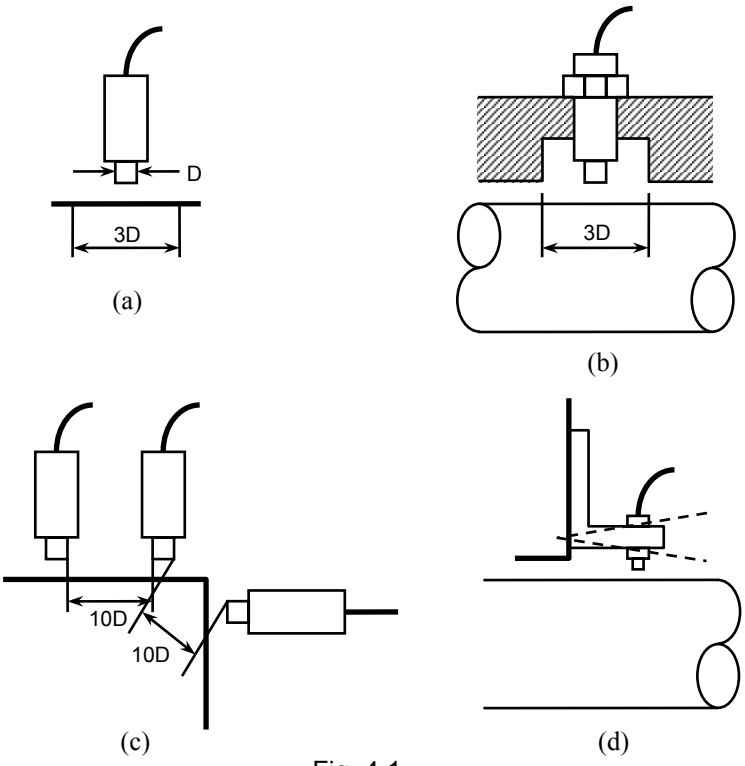


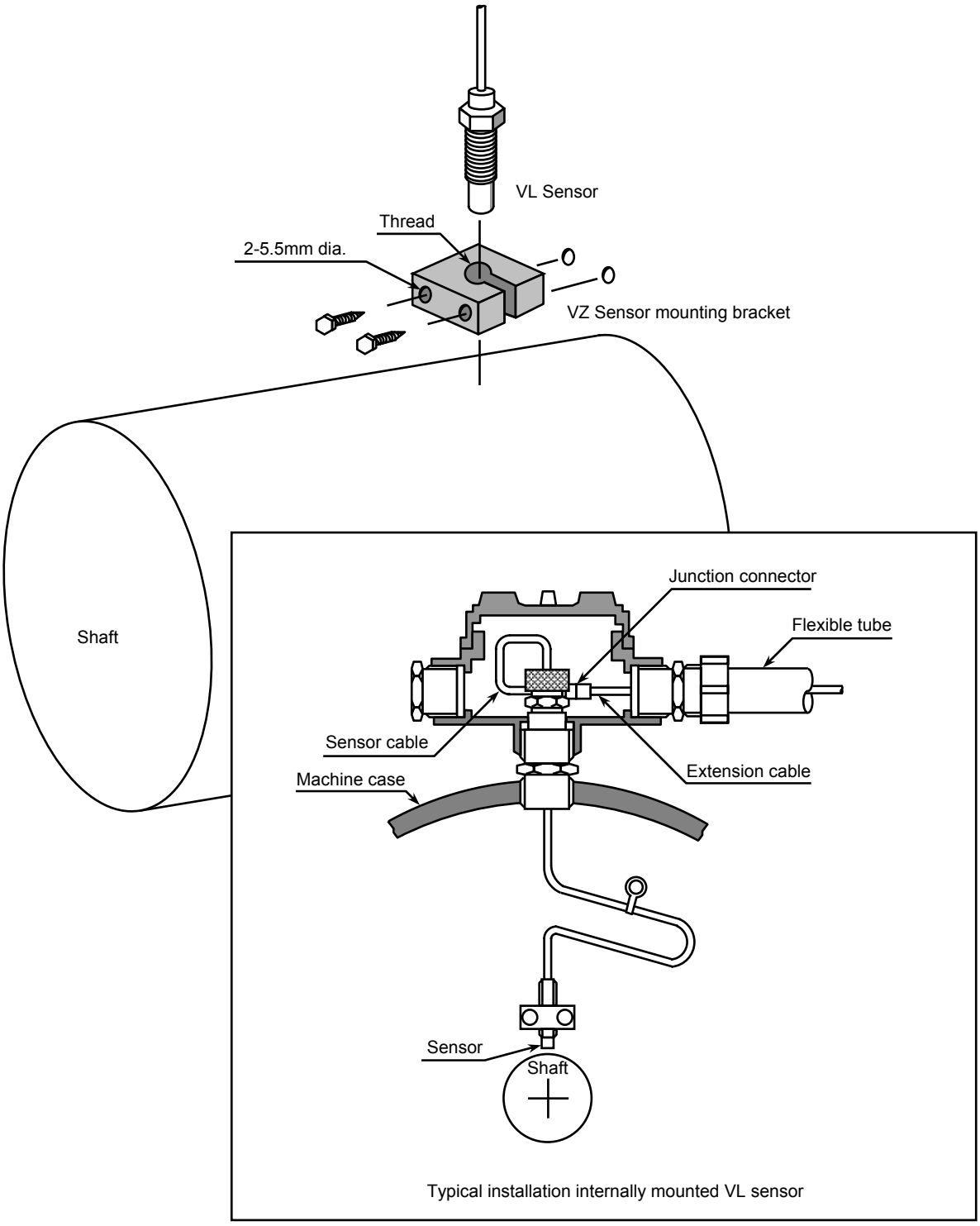
Fig. 4.1

4.4 VL SENSOR INSTALLATION ACCESSORIES

Standard sensor installation accessories are shown below.

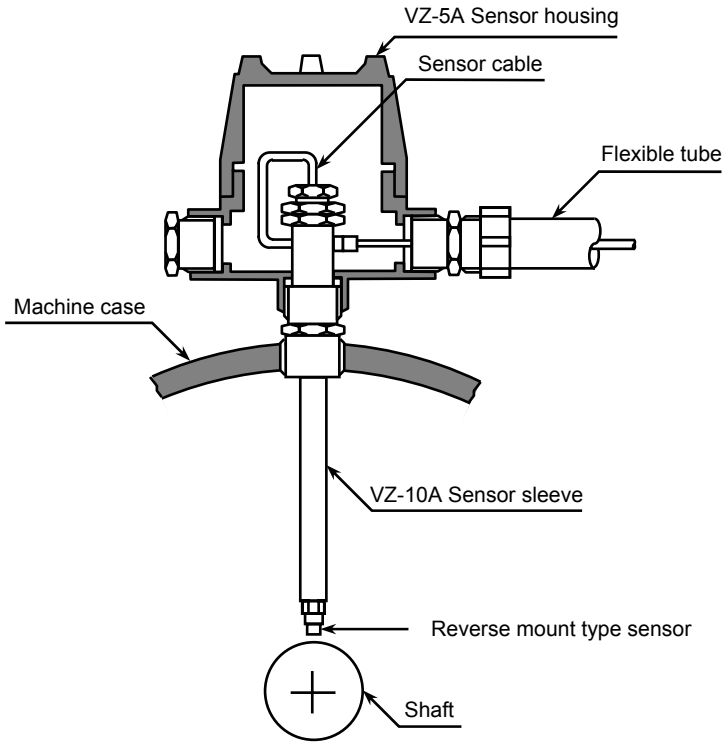
Using this reference, select desired accessories in consideration of installation space, etc.

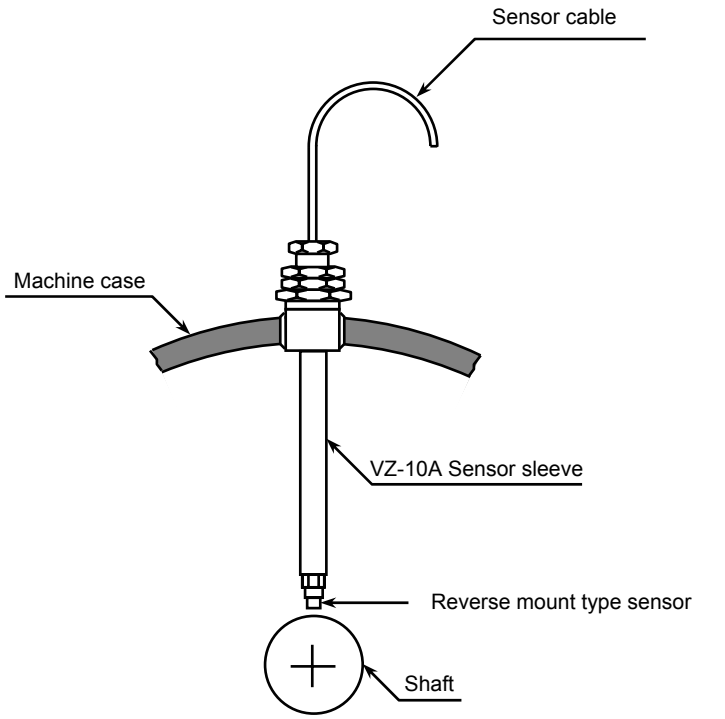
4.4.1 SENSOR MOUNTING BRACKET



Typical installation internally mounted VL sensor

4.4.2 VL SENSOR EXTERNAL MOUNTING KIT





4.5 INSTALLATION PROCEDURES

4.5.1 ADJUSTMENT OF VL SENSOR SET GAP

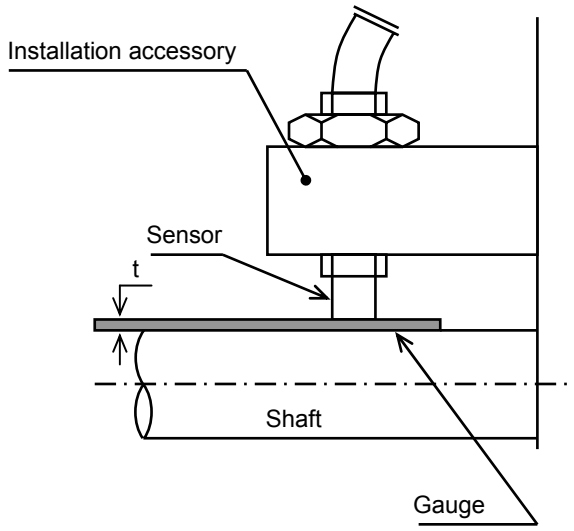
This transducer system offers a linear range of more than 2,000μm for JIS SCM440 (AISI 4140 Steel) as a standard calibrated material, and measures the gap between sensor and target within this range.

However, linear range and scale factors may differ with target material, installation space, etc.

⚠ CAUTION

1. When adjusting the sensor set gap, refer to the TECHNICAL DATA, adjust and set sensor set gap so that sensor does not contact target even at maximum proximity, and such that gap is not beyond range of connected monitor.
2. Beware not to apply the impact force to the sensor, which may cause the damage.

4.5.2 WHEN USING NONMETALLIC FEELER GAUGE



Insert gauge for desired set gap between sensor and target.

Fix sensor at the position where the gauge can be slipped out smoothly.

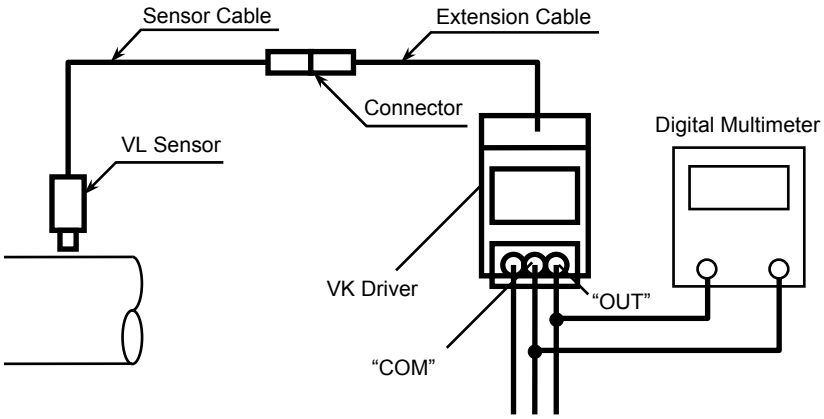
⚠ CAUTION

Do not scratch sensor tip or target surface.

READING OUTPUT VOLTAGE

In order to read the output voltage, the power supply input of the VK Driver as well as sensors etc. must all be wired/connected according to “5. INTERCONNECTION”.

If the object to be measured is of other than standard material, obtain set gap voltage from “6. TECHNICAL DATA”.



⚠CAUTION

To prevent twisting, disconnect sensor cable from extension cable when mounting sensor.

First approach the VL sensor to the target and read the gap voltage indicated on a voltmeter etc. connected across the VK Driver output terminals “COM-OUT”.

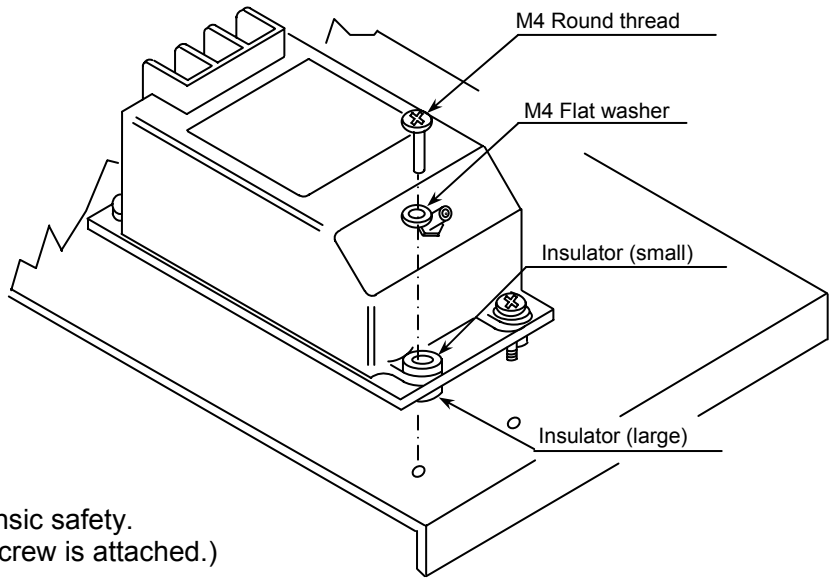
In accordance with this voltage and “6. TECHNICAL DATA” adjust VL sensor gap and fix sensor such that voltage agrees with gap.

4.6 VK DRIVER INSTALLATION AND REMOVAL

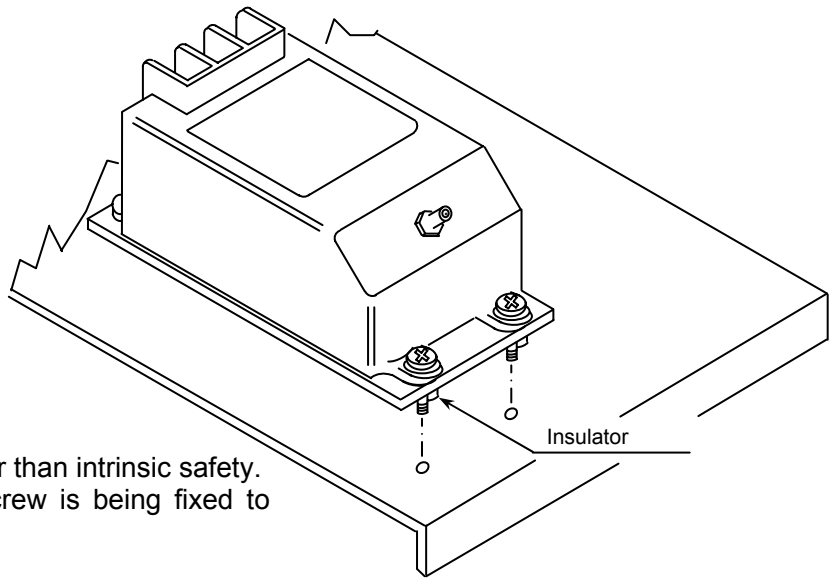
- SHINKAWA Electric recommends that the driver be installed in VT-1B Driver Housing (optional). When installing the driver on the panel or rack, avoid a place with high vibration, instability, high temperature and much moisture as well as high density corrosive materials.
  Fix the driver in the specified place with prepared four (4) screws to be inserted into mounting holes on the bottom surface.

⚠CAUTION

- The mounting holes are provided with insulators for insulation against earth. Make sure to install the supplied 4 sets of mounting screws (M4, flat washers) by inserting them through the insulators.
  Installation without these insulators may cause interference noise in the output.
- Turn four attachment screws equally in the case of attachment and removal. When it is going to loosen and remove one screw at a time especially in other than intrinsic safety, a screw may separate from an insulator.



In the case of intrinsic safety.
(The attachment screw is attached.)



In the cases of other than intrinsic safety.
(The attachment screw is being fixed to the insulator.)

4.7 TROUBLESHOOTING

No.	TROUBLE	PROBABLE CAUSE	CHECK	COUNTERMEASURES
1	Output is zero and no change.	1) Power is not supplied.	1) Measure power supply voltage.	1) Supply power.
		2) Faulty driver.		2) Replace driver.
2	Output does not change from approx. -0.7V.	1) Sensor too close to target.	1) Measure distance.	1) Adjust.
		2) Short circuit in sensor.	2) Measure resistance. (Normally approx.4Ω)	2) Replace.
		3) Short circuit in extension cable.	3) Measure resistance. Normally; Inner conductor Approx. 0.6Ω Outer conductor 0Ω Between inner and outer conductors ∞Ω	3) Replace.
		4) Faulty driver.		4) Replace.
		5) A foreign substance is included in a connector.		5) To remove the foreign substance.
3	Output does not change from approx. -22V. (with barrier -19V)	1) Far distance between target and sensor.	1) Measure distance.	1) Adjust.
		2) Open circuit in sensor.	2) Measure resistance. (Normally approx.4Ω)	2) Replace.
		3) Open circuit in extension cable.	3) Measure resistance. Normally; Inner conductor Approx. 0.6Ω Outer conductor 0Ω Between inner and outer conductors ∞Ω	3) Replace.
		4) Faulty driver.		4) Replace.
		5) Is connector securely connected.		5) Connect securely.

5. INTERCONNECTION

VK-202A

5.1 CABLING PROCEDURE

Use cabling procedure recommended by API Standard 670.

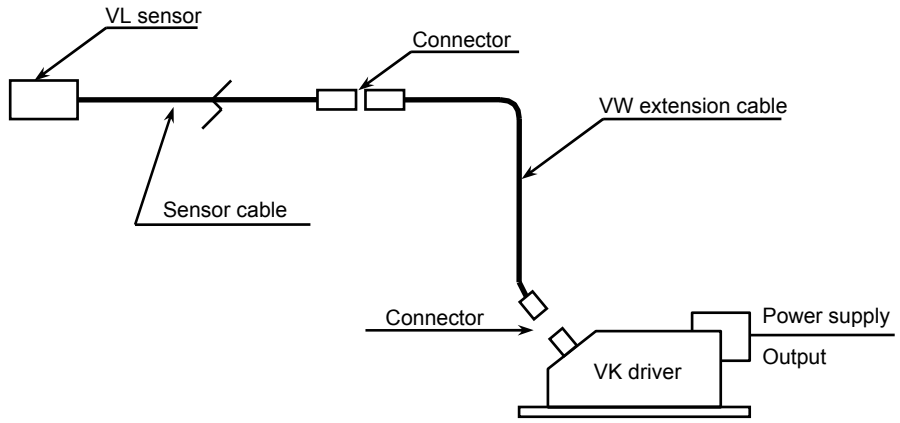
Refer to “7. API St’d 670” and section “5.3 to 5.5”.

5.2 PART INTERCONNECTION

The sensor, extension cable and driver shall be connected as shown in the below.

⚠ CAUTION

1. The sensor, extension cable and driver, which are calibrated as a system at the manufacturer, shall be connected with each serial No. as specified in the inspection test report.
   If this is not adhered the output characteristics may be out of specification.
2. If the sensor and driver are connected without the extension cable, the output will differ from the specification greatly.



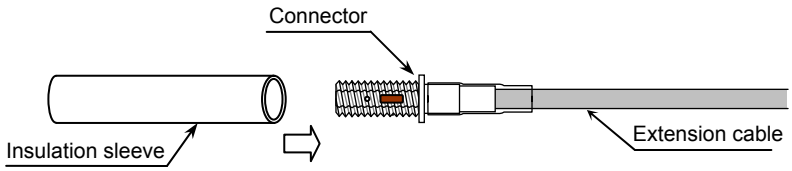
⚠ CAUTION

1. Before tightening the connector, the connector internal should be checked to confirm that there is no foreign particle, which may cause the bad characteristics due to the imperfect contact.
2. Connectors should be tightened with the fingers.
   If a tool is used, connectors may be damaged.
   Tighten the connector certainly, not to cause the connector to loose again.
   In the case of the loose connector may result because of the installation condition, tighten the connector by pliers up to about quarter.
3. Beware not to apply the excessive force on the thread part of the connector, which may cause the damage.
4. After tightening connector, make sure that the cable torque does not cause the connector to loosen again.
   If the installation conditions cannot be changed to prevent this force acting on the connector, the force should acts in the tightening direction of the connector.
   If the installation direction of the extension cable is such that a force acts in loosening direction of the connector, twist the extension cable lightly in the direction of that the resulting repulsive force acts to tighten the connector. Then connect the connector and tighten.
   (SHINKAWA Electric recommends to take up the surplus length of the extension cable by winding it into a cable box. If the excessive extension cable needs to be accommodated in the driver housing for some unavoidable reasons, do not push it forcibly in the housing, and also do not cut it.)

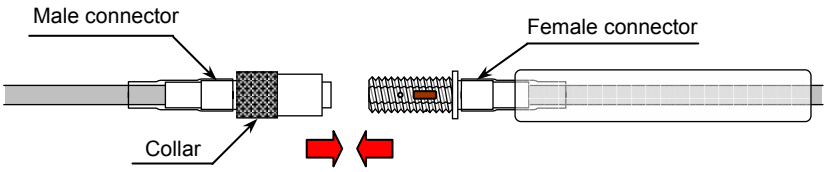
5.3 CONNECTOR INSULATION

When installing sensor and extension cables, cover coaxial connector with insulation sleeve (transparent shrink tube) for ground insulation and insulation to flexible armor (optional).

Step 1) Pass connector through insulation sleeve.

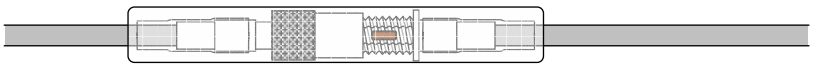


Step 2) Connect connector.



① Check that no foreign substance is present in the connector.
② Insert connector male connector into female connector.
③ Tighten the collar by fingers.

Step 3) Cover connector with insulation sleeve.



Step 4) Carefully apply heat to shrink insulation sleeve.

- If insulation sleeve tubing is not available, wrap the connector with insulating material such as fluoro resin tape.

⚠CAUTION

The vinyl-insulating tape shall not be used, which may cause the wiring trouble in the case of the temperature more than 80°C.

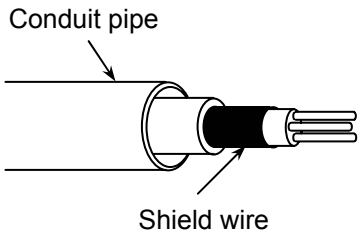
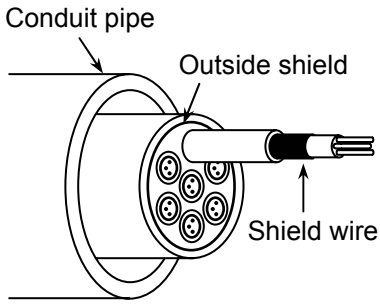
5.4 CONNECTION OF SIGNAL TRANSMISSION CABLE

- For interconnection between the VK driver and the monitor make sure to use 3-core shielded cables or pair shielded standard 3-wire instrument cables, since the signal transmitted is weak.

⚠CAUTION

Do not use unshielded cables or non-pair shielded multicore cables as the measured values could be affected by external noise.

5.4.1 RECOMMENDED CABLES

Cable	Recommended	Note
3-core shielded cable  	EXCELLENT	Recommended cabling as per API st'd 670 Normal : Silver plated braid. Recommended: Copper tape shield. (Core wire : Soft copper wire) Use conduit pipe (cable rack) for wiring.
Instrument cable  	GOOD	Vibration and displacement signals can exit in one instrument cable. A high amplitude vibration signal exerts injurious influence over other displacement and vibration signals in a common cable. Therefore, separate cables must be used. Recommended: Outside shield of aluminum or copper tape.

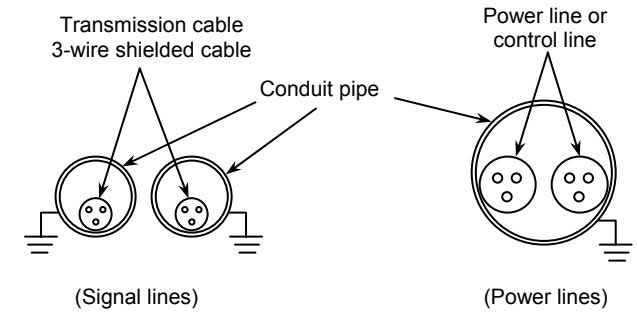
⚠CAUTION

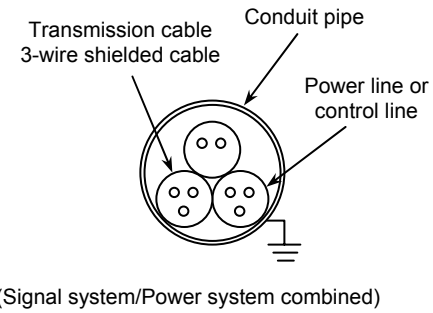
1. For cable wiring for pulse signals (phase marker, revolution) separate them from cables for displacement and vibration signals.
2. Avoid running signal transmission cables together with control and power cables.
3. Install all cables in conduit pipes or on cable racks.
4. After the megger test of the signal cable, discharge the charged electric load before connecting the cable.
   If this caution is not adhered to, the transducer and monitor could be damaged.

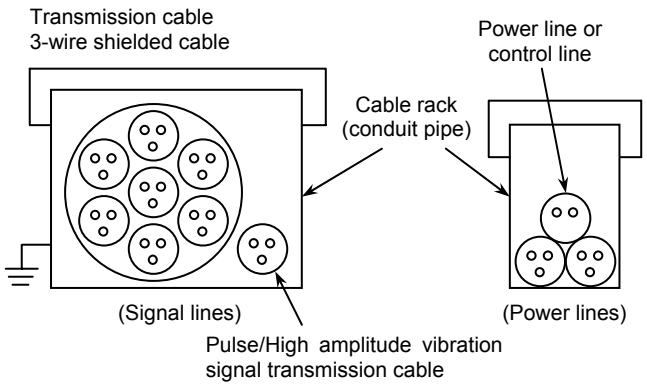
5.4.2 CABLE SIZE

- Use cables with AWG No. 14 to 18 (0.75mm^2 to 2mm^2) gauge stranded conductors.

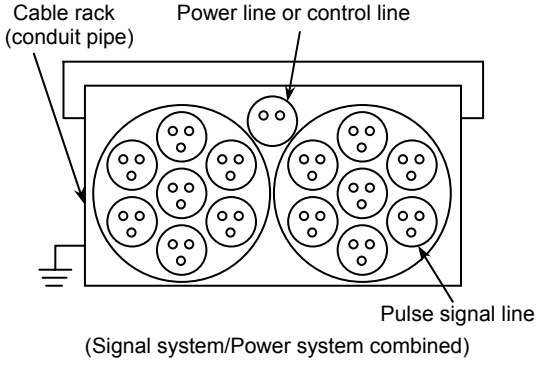
5.4.3 CABLING PROCEDURE







(Recommended)



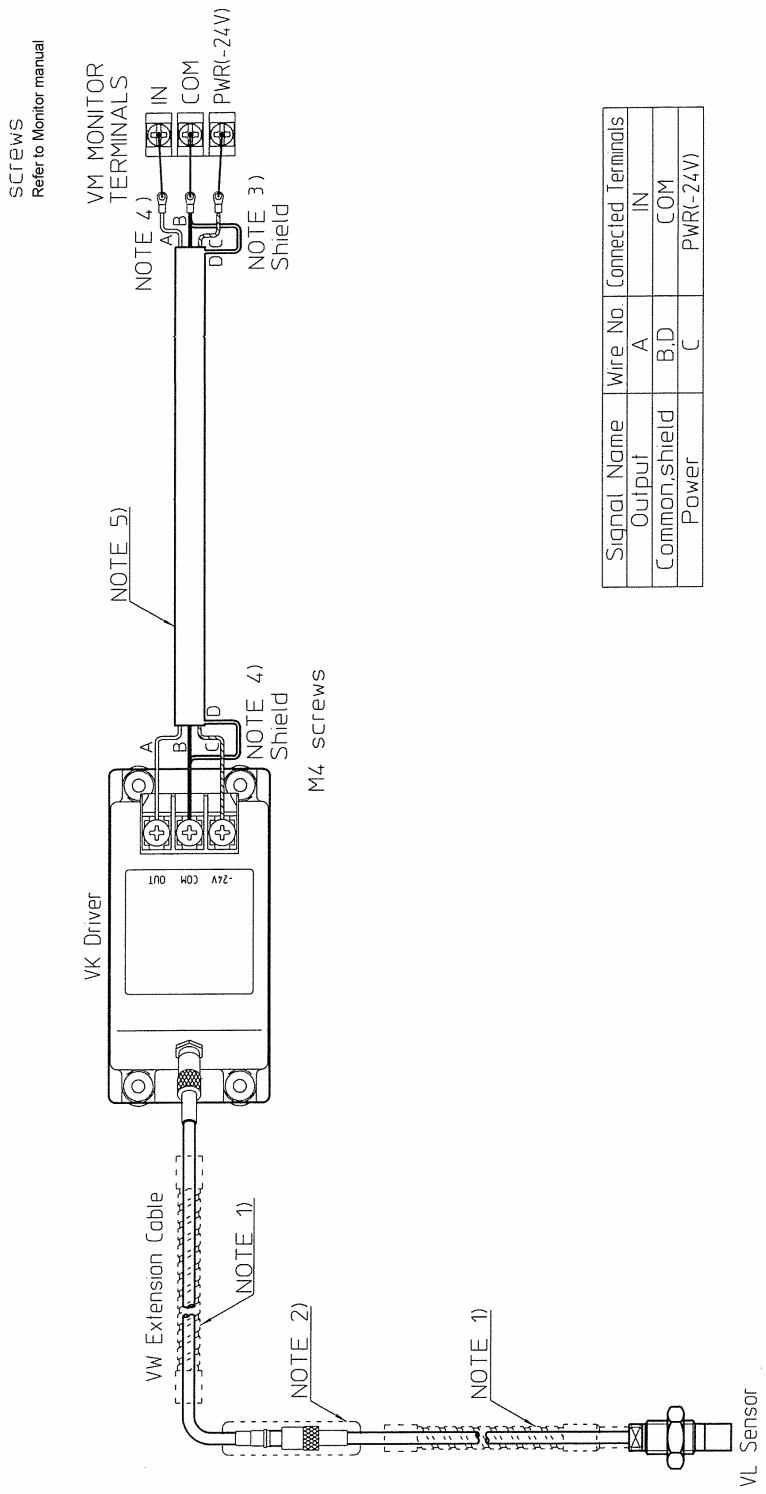
(Not recommended)

⚠CAUTION

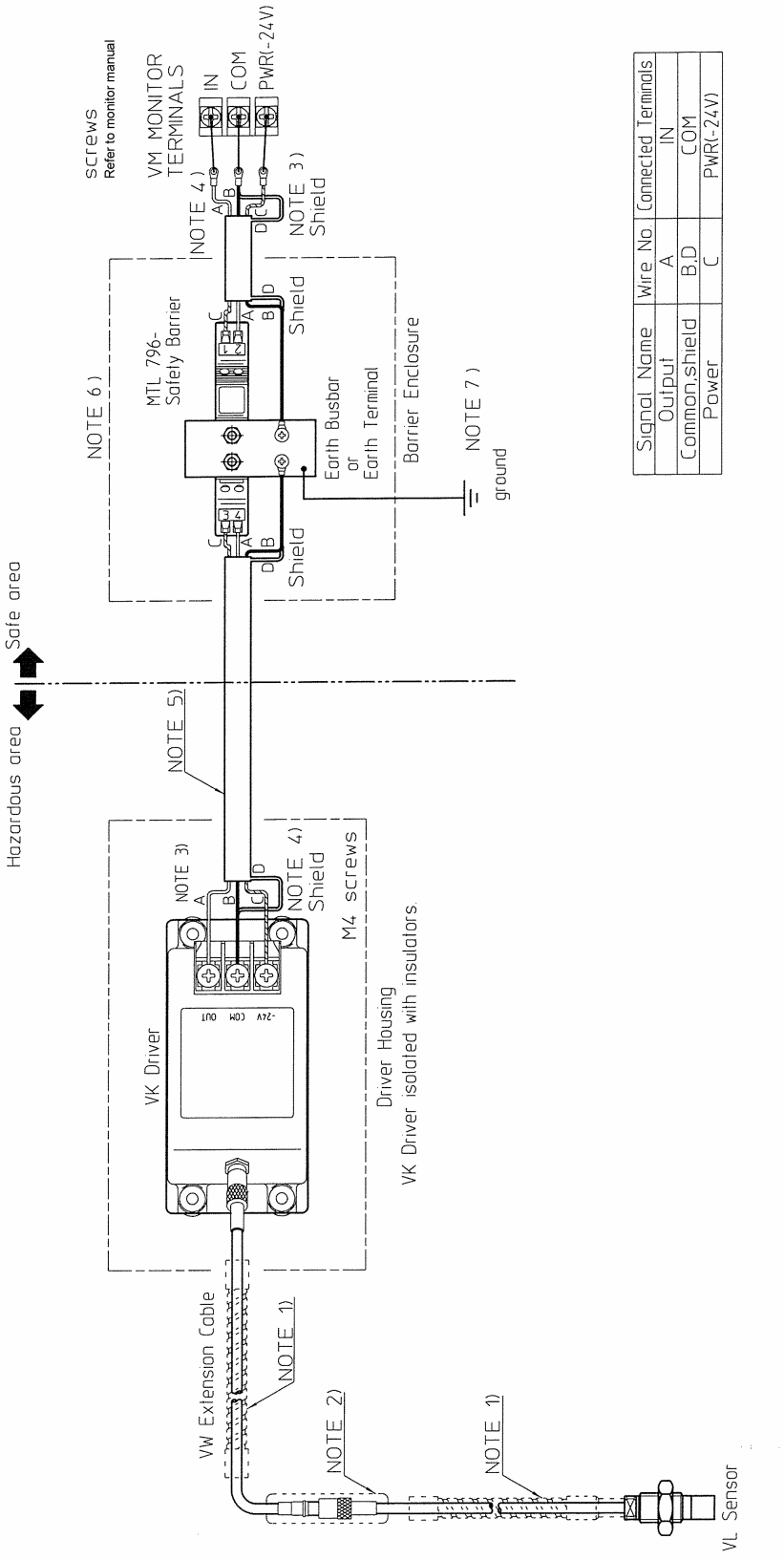
Earth grounding should be grounded at only one end.

5.5 FIELD WIRING DIAGRAM

5.5.1 NON-INTRINSIC SAFETY SPECIFICATION



5.5.2 INTRINSIC SAFETY SPECIFICATIONS



5. INTERCONNECTION

VK-202A

⚠ WARNING

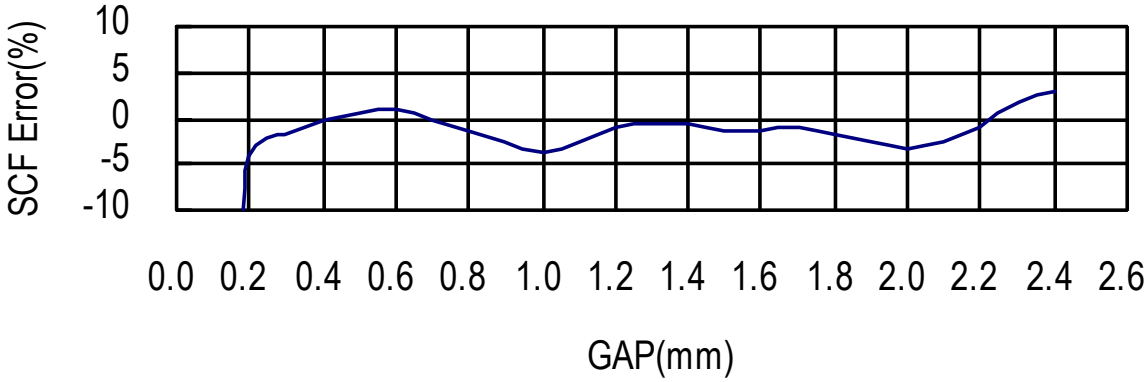
Beware of electric shock from high-voltage parts.

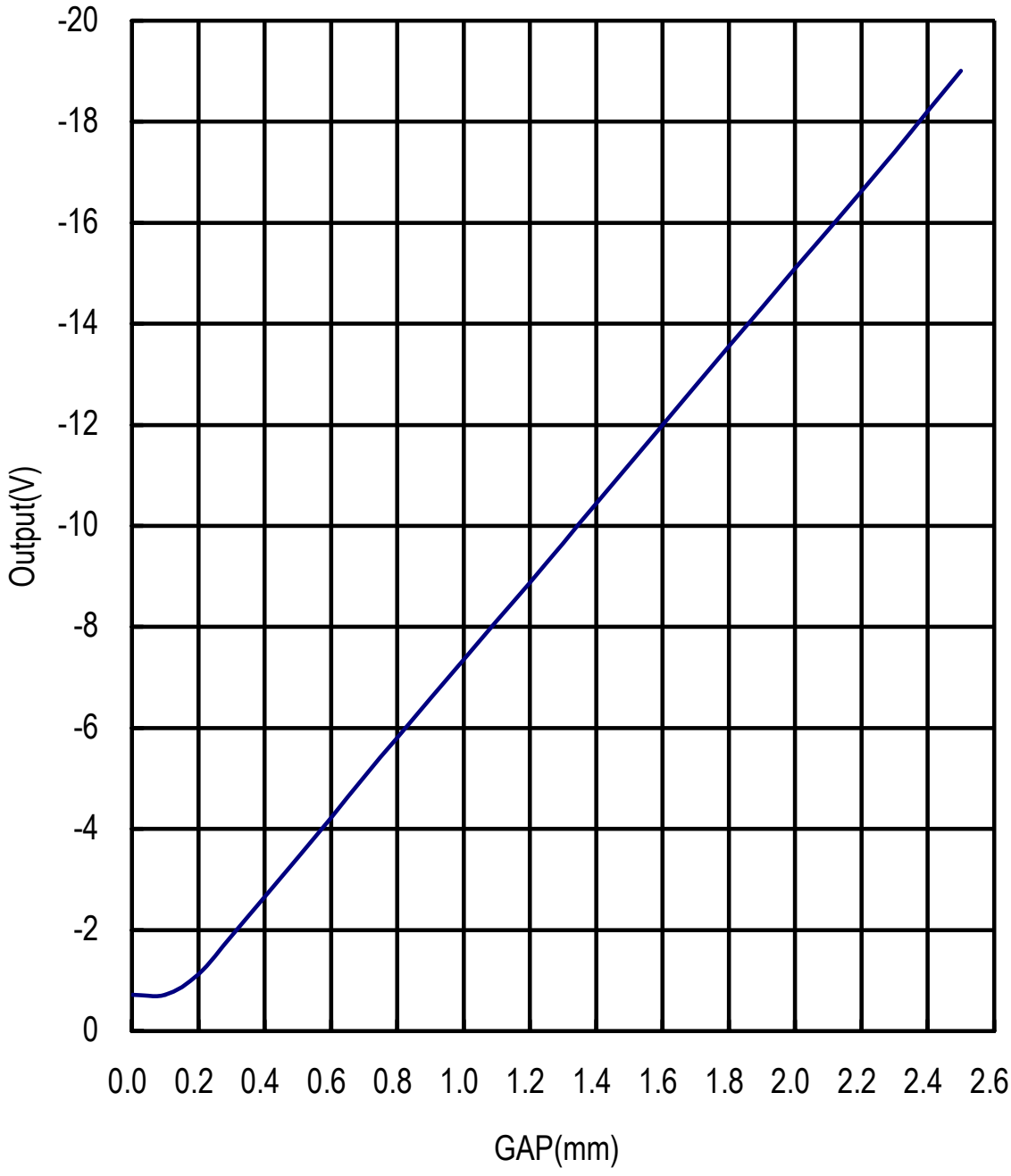
⚠ CAUTION

Be sure to observe the following cautions at the time of interconnection.

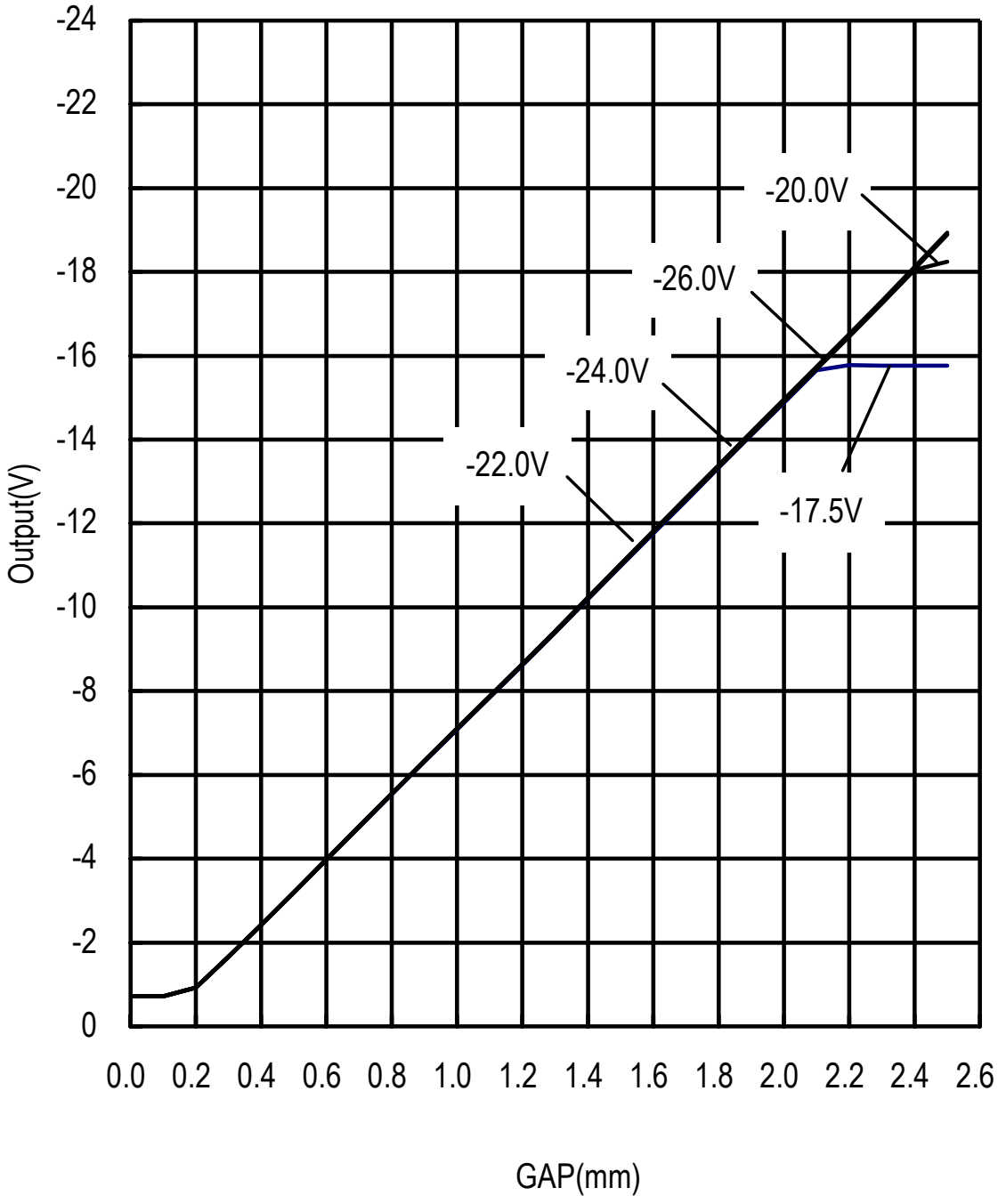
Caution No. in drawing	Caution
NOTE 1	Allowable bending radius Without armor : 30 mm With armor : 50 mm Allowable tension : 98.1N (10 kgf REF.)
NOTE 2	To insulate the connector, cover it with the supplied shrink tube (insulating sleeve) or insulating tape. Take measures to prevent oil or water from entering the insulating sleeve or tape. (refer to section “5.3”) in case of the intrinsically safe spesification.
NOTE 3	The terminal of the VK driver must be used with the terminal cover and the connected cable must be fixed with the cable clamp at near the terminal certainly. The VK driver must be installed in the housing.
NOTE 4	Keep the unshielded portion of cables at connecting parts as short as possible. Connect the shielded wires to the COM terminal.
NOTE 5	Use a 3-core shielded cable with AWG No. 14 to No. 18 gage stranded conductors for wiring between the VK driver and the monitor. Do not wire the cables together in high tension ducts. (refer to section “5.4”) Refer to “8. INFORMATION ABOUT INTRINSICALLY SAFE APPLICATION” in case of the intrinsically safe spesification.
NOTE 6	The safety barrier must be installed in the enclosure.
NOTE 7	Refer to “8. INFORMATION ABOUT INTRINSICALLY SAFE APPLICATION” in case of the intrinsically safe spesification.

6.1 STANDARD STATIC CHARACTERISTIC (TARGET MATERIAL: SCM440)

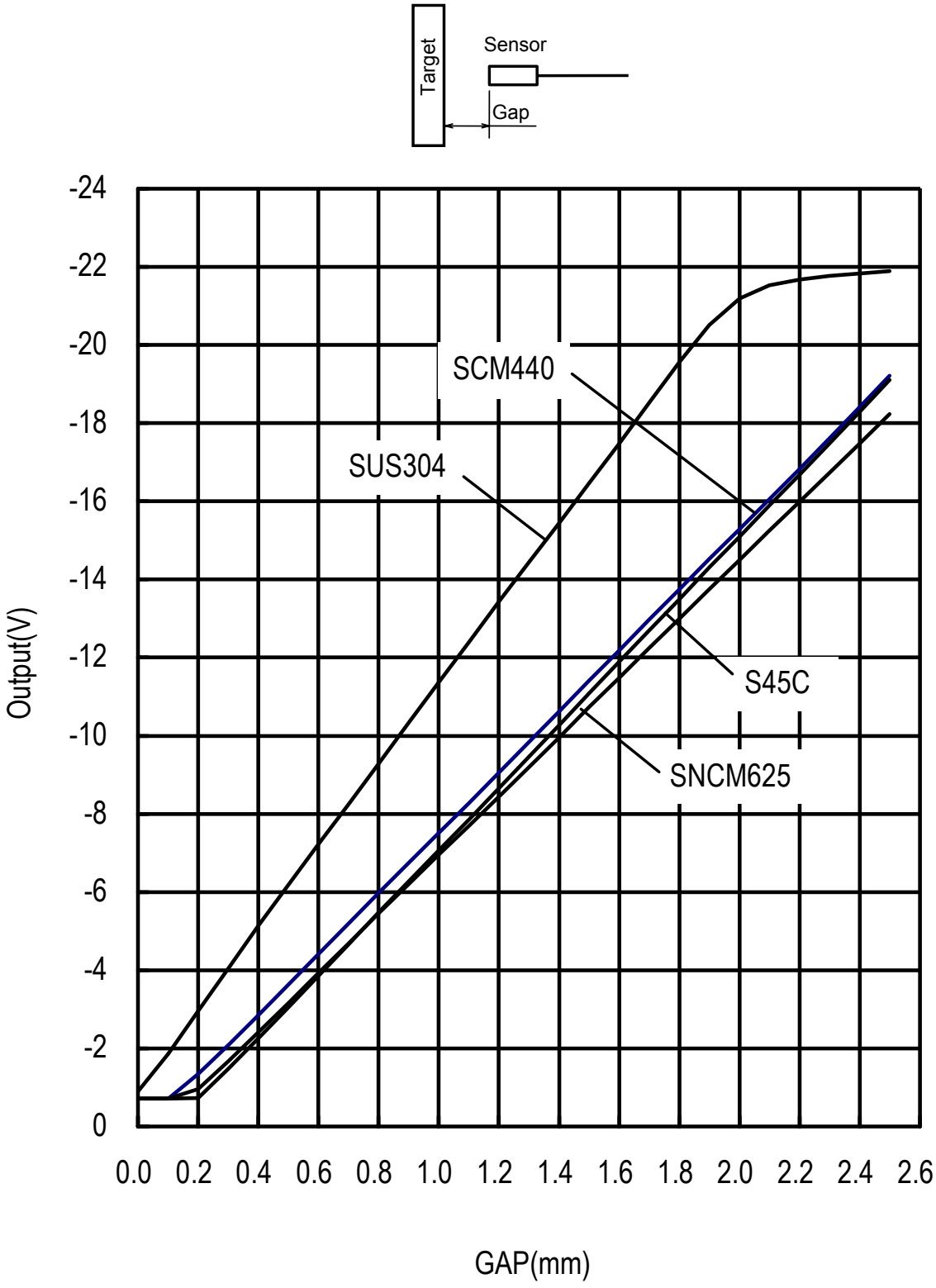




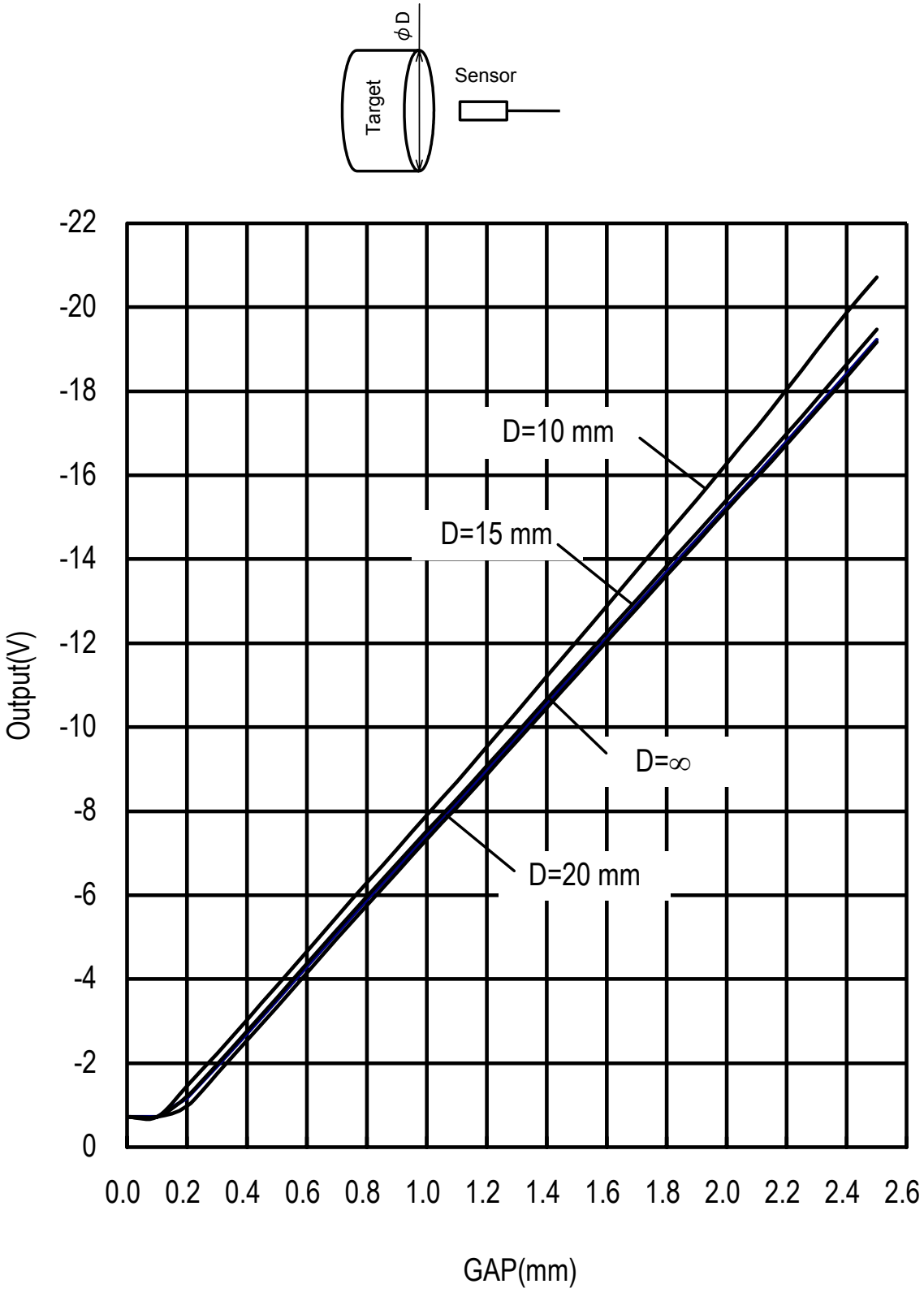
6.2 TEST DATA FOR DC POWER SUPPLY VARIATION (TARGET MATERIAL: SCM440)



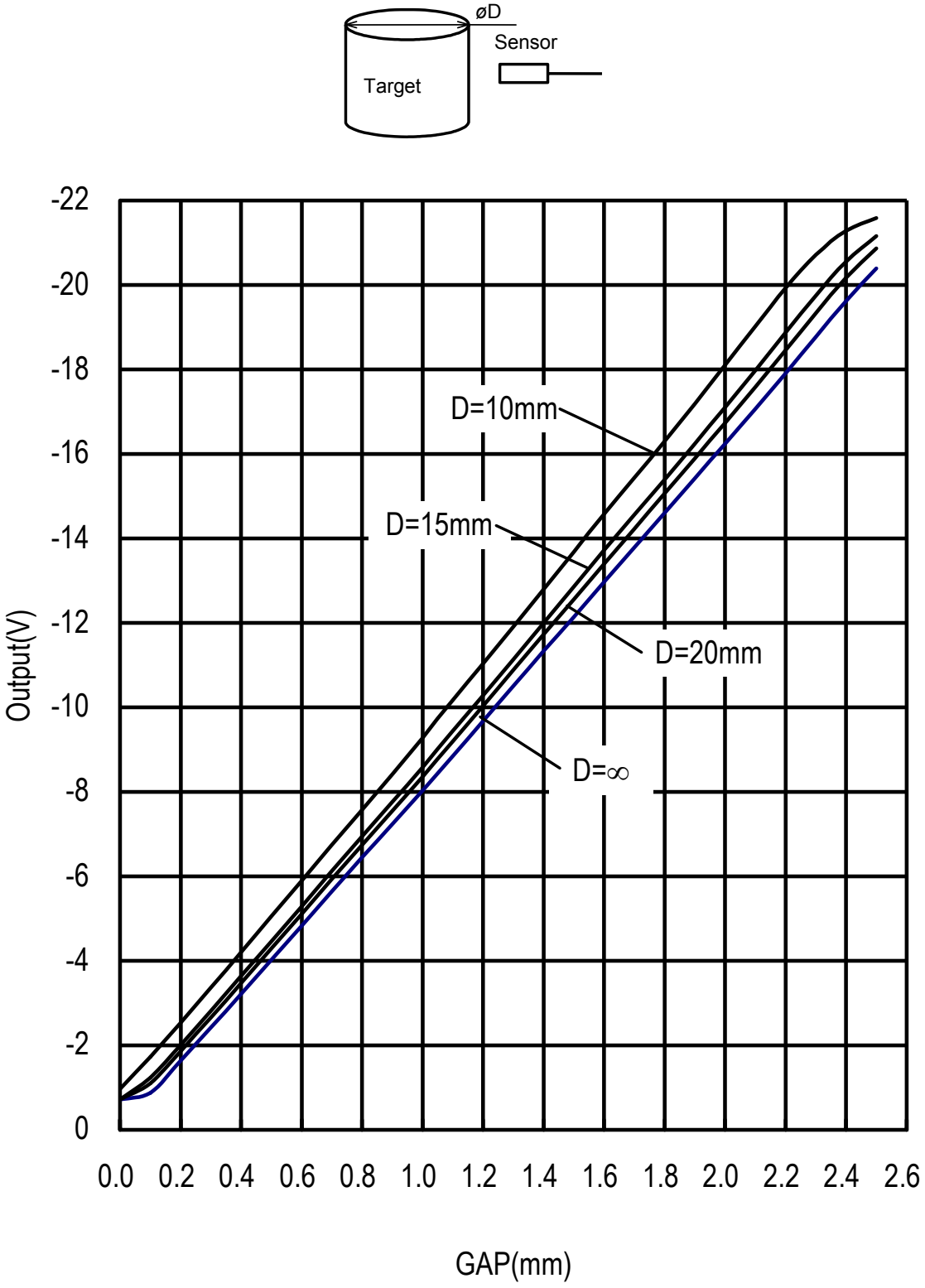
6.3 TEST DATA FOR TARGET MATERIAL



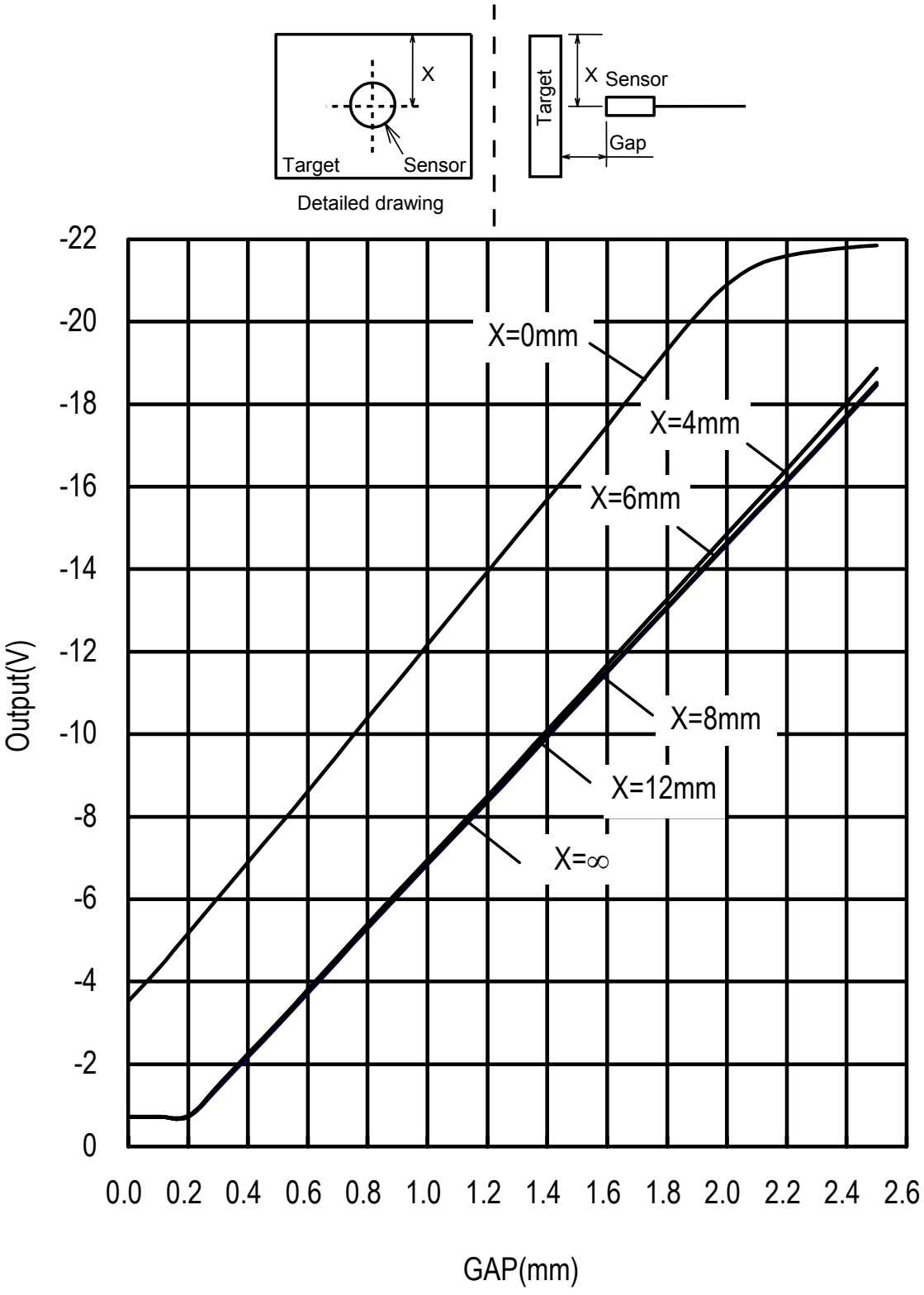
6.4 TEST DATA FOR TARGET DIAMETER (TARGET MATERIAL: SCM440)



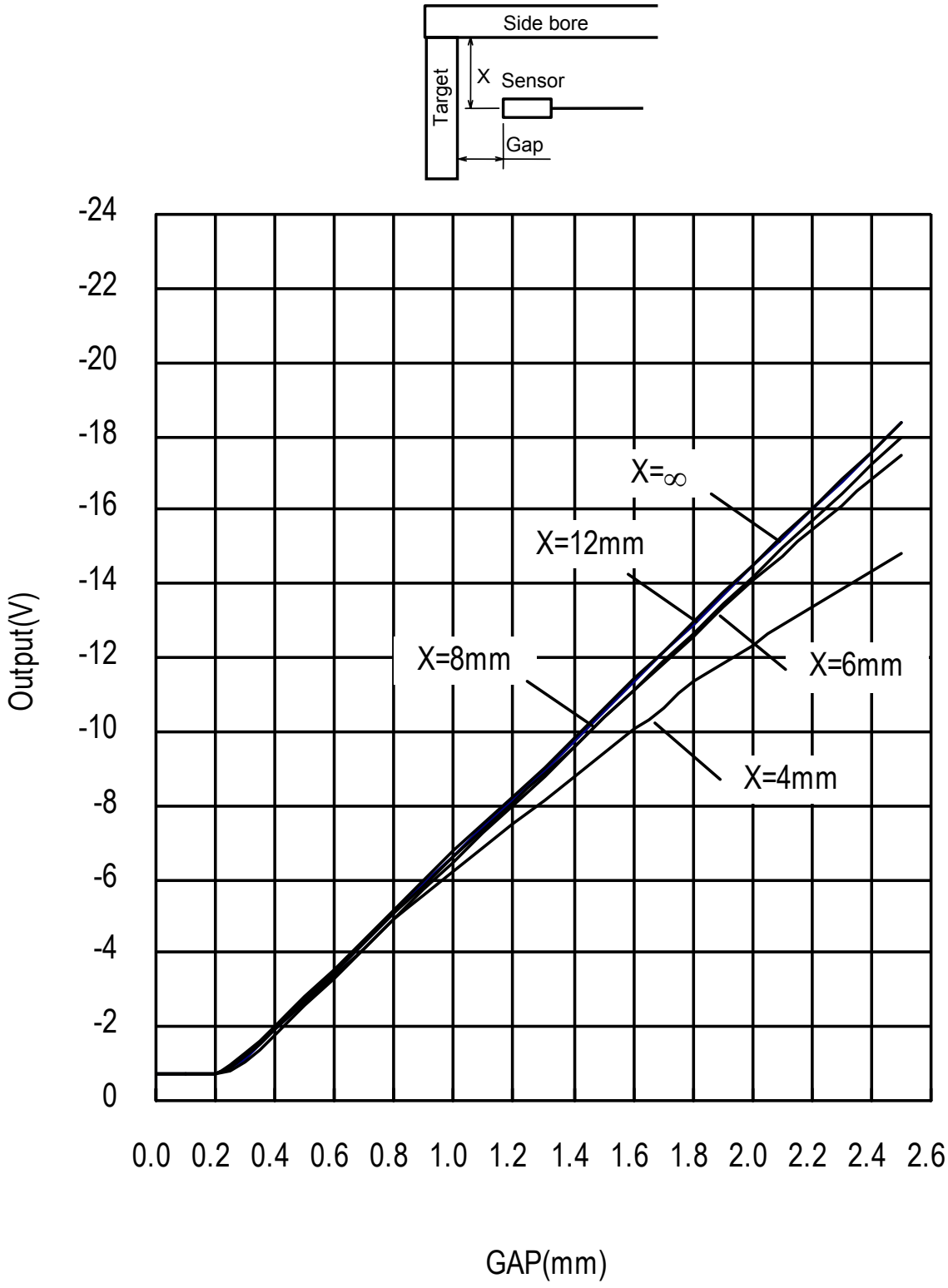
6.5 TEST DATA FOR TARGET CURVATURE (TARGET MATERIAL: SCM440)



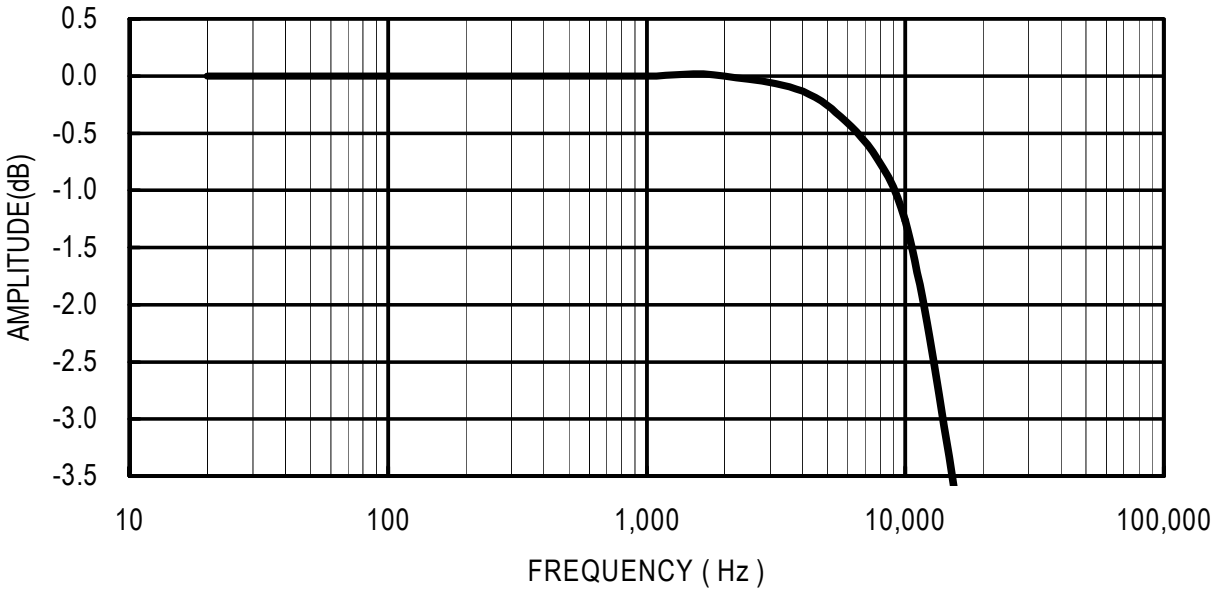
6.6 TEST DATA FOR TARGET EDGE (TARGET MATERIAL: SCM440)



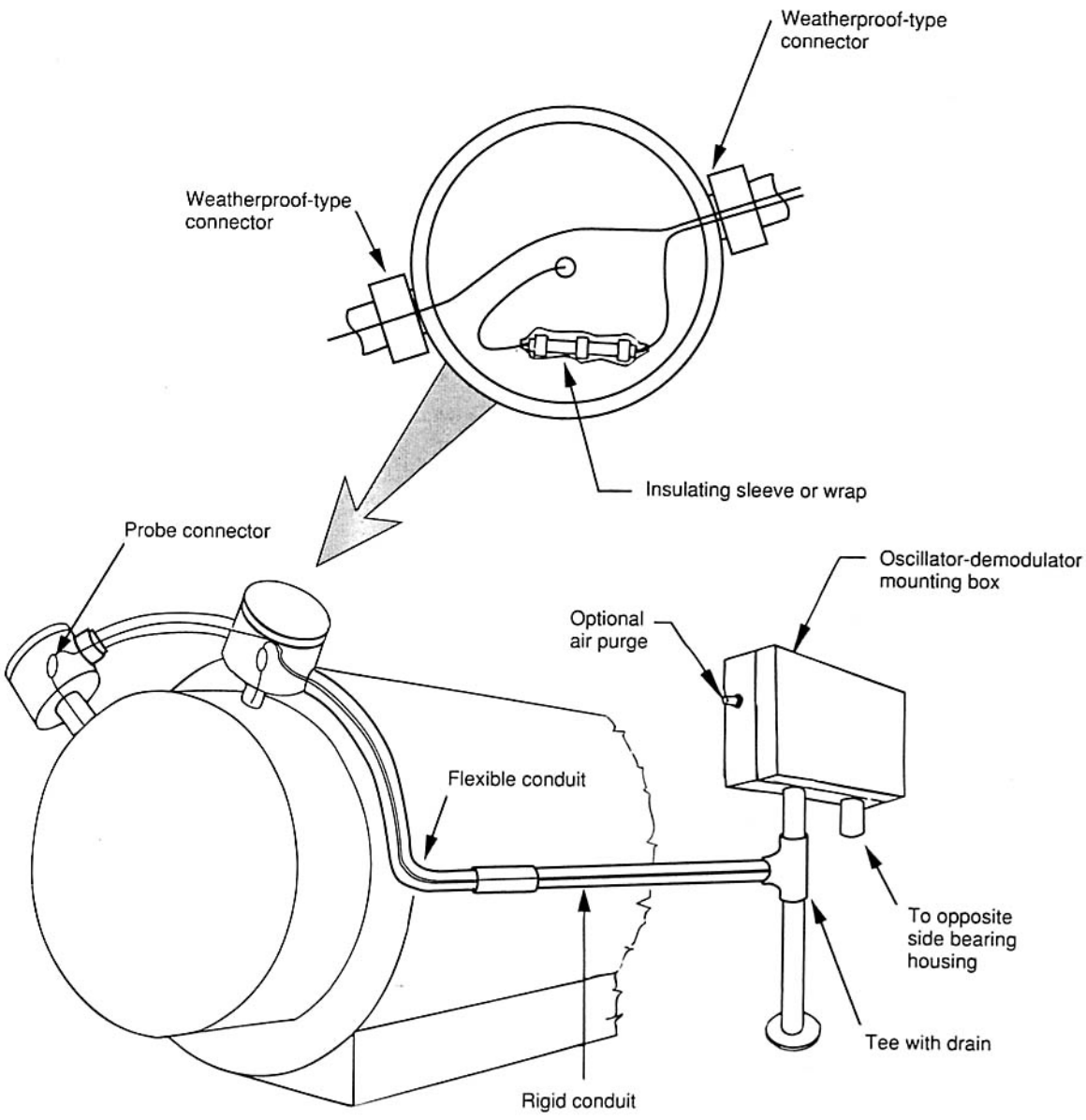
6.7 TEST DATA FOR SIDE BORE (TARGET MATERIAL: SCM440)



6.8 FREQUENCY CHARACTERISTICS (at 400μm pk-pk)

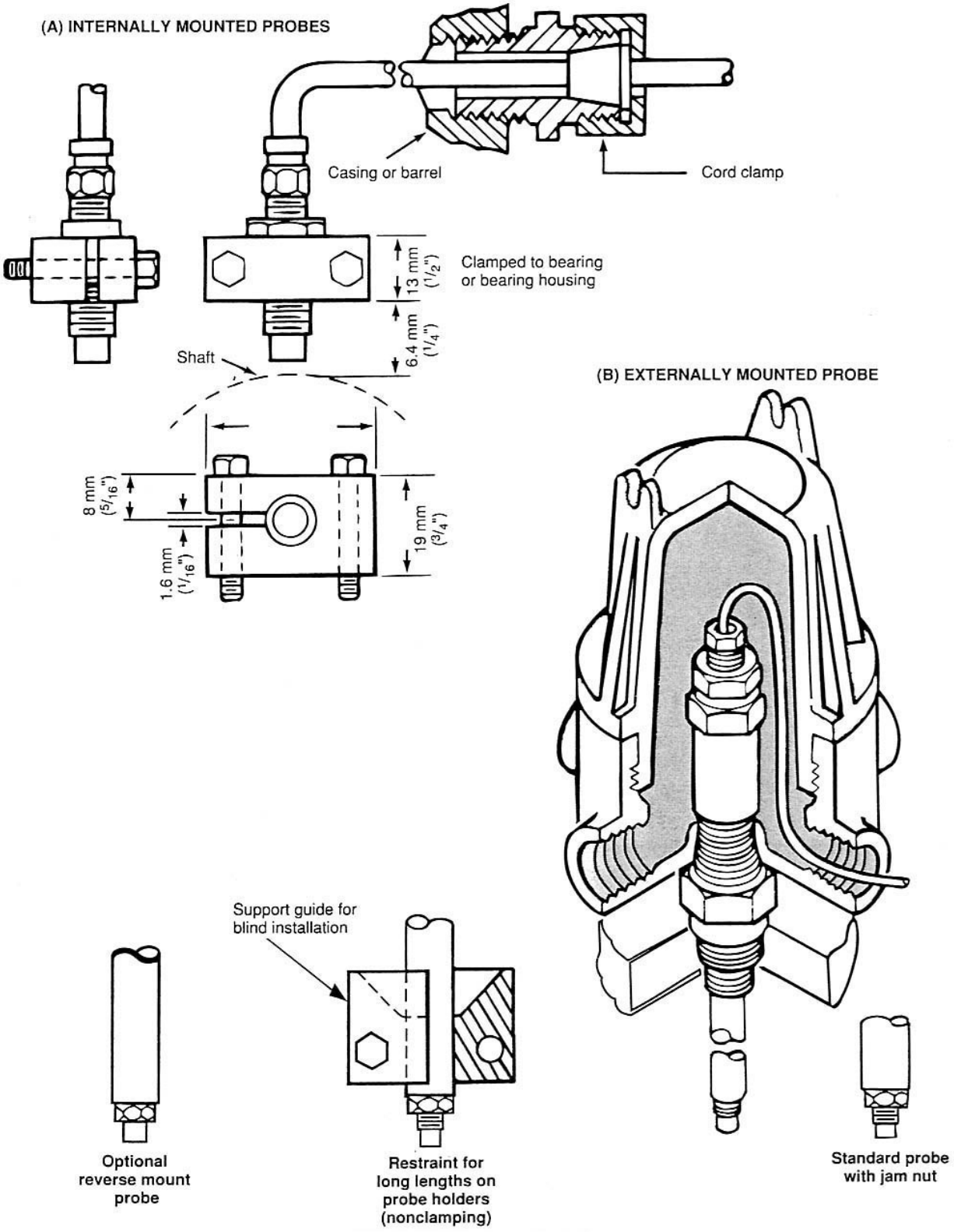


7.1 TYPICAL STANDARD CONDUIT ARRANGEMENTS



Note: Probe extension cable connectors shall be insulated from ground.

7.2 TYPICAL PROBE MOUNTING ARRANGEMENTS

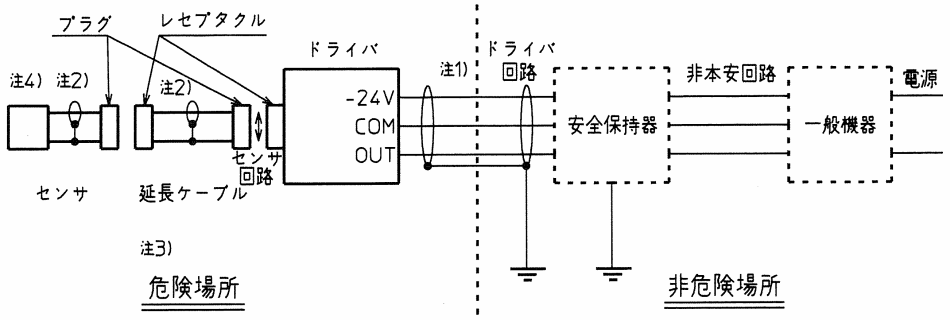


8.1 TIIS (Japanese Only)

8A03-001-S002

改訂番号	年 月 日	改 訂 事 項	担 当	承 認
1	・ ・			
2	・ ・			
3	・ ・			

1.本安機器は、以下に示すように構成して使用すること。



注1) 本安回路外部配線には，シールド付きケーブルを使用すること。
注2) センサケーブル及び延長ケーブルは、外傷を受ける恐れがない場合を除き、必ずフレキシブルアーマを付けて使用すること。
注3) 本安機器は仕様の変更、改造が禁止されています。
注4) センサは、ねじ部により接地された金属に取り付けること。
注5) センサ全長と延長ケーブル全長との和は、5m±10%又は9m±10%を満たすこと。
注6) センサ，延長ケーブル，ドライバは周囲温度60℃以内で使用すること。
注7) 本安機器、本安関連機器およびそれ等を接続する配線は、電磁誘導または静電誘導により、本安回路の本質安全防爆性能を損なうような電流および電圧が、当該本安回路に誘起されないように配置すること。

2.本安機器と接続して使用する安全保持器は、安全保持器のみで型式検定に合格したもので、以下の条件を満足すること。(推奨安全保持器：MTL 796-)

(1)安全保持定格
本安回路最大電圧 26V以下
本安回路最大電流 138mA以下
本安回路最大電力 810mW以下

(2)性能区分及びグループ
性能区分 ia
グループ IIC

(3)本安回路許容インダクタンス及び本安回路許容キャパシタンスと本安回路外部配線のインダクタンス(Lw)及びキャパシタンス(Cw)との関係
本安回路許容インダクタンス(Lo) ≧ (1.188mH+Lw)
本安回路許容キャパシタンス(Co) ≧ (0.026μF+Cw)
参考)MTL796-(型式検定合格番号：第C13161号)を使用する場合のLw,Cw
Lo=1.9mH, Co=0.16μF → Lw≦0.712mH, Cw≦0.134μF

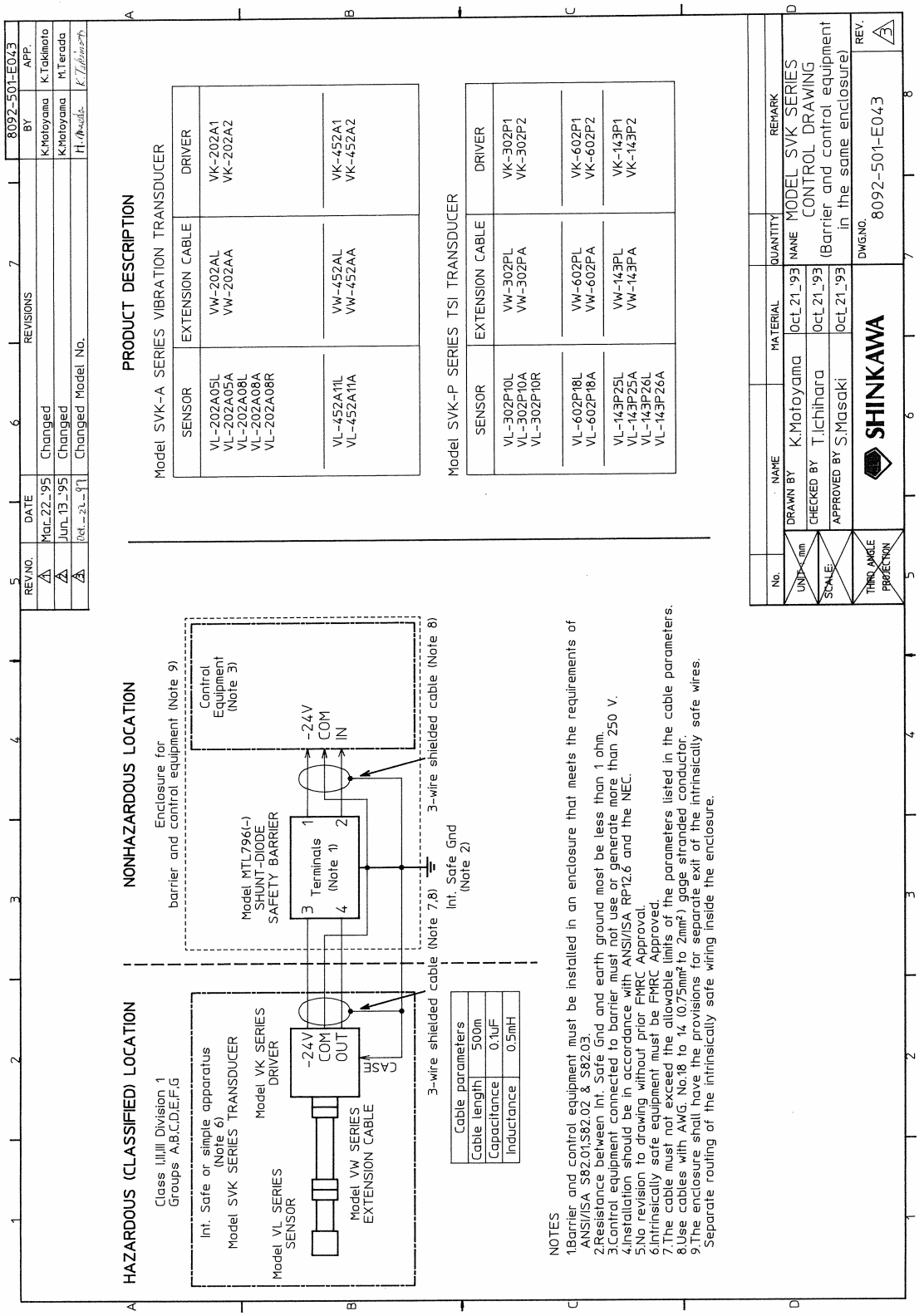
部番	名称	材質	個数	備考

公差等級	承認	検図	設計	尺度	名称	VK-202A本質安全防爆時(TIIS) 機器構成図
JIS B 0405 -	榎本 '05・02・14	前田 '05・02・14	品川 '05・02・14			

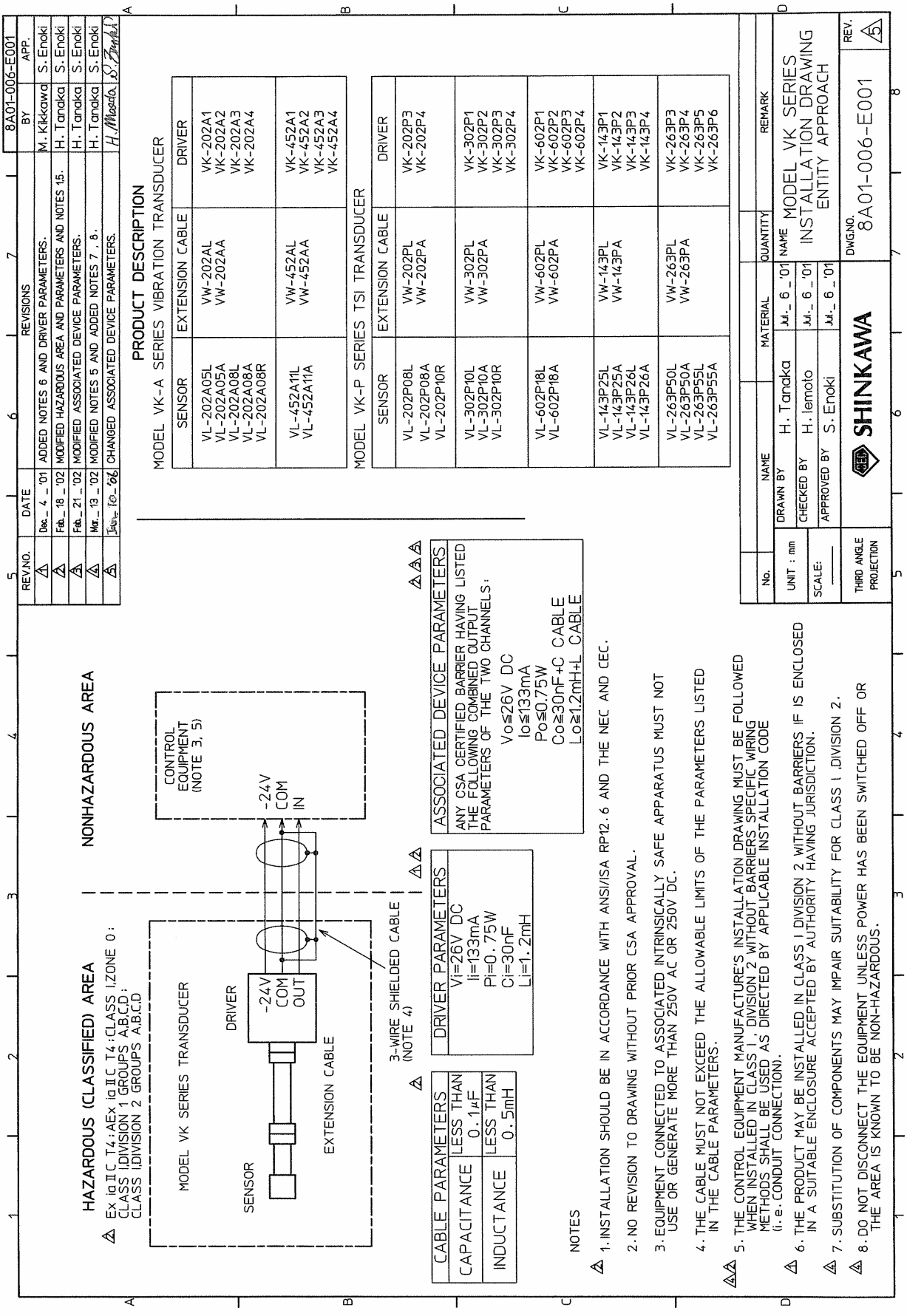
SHINKAWA

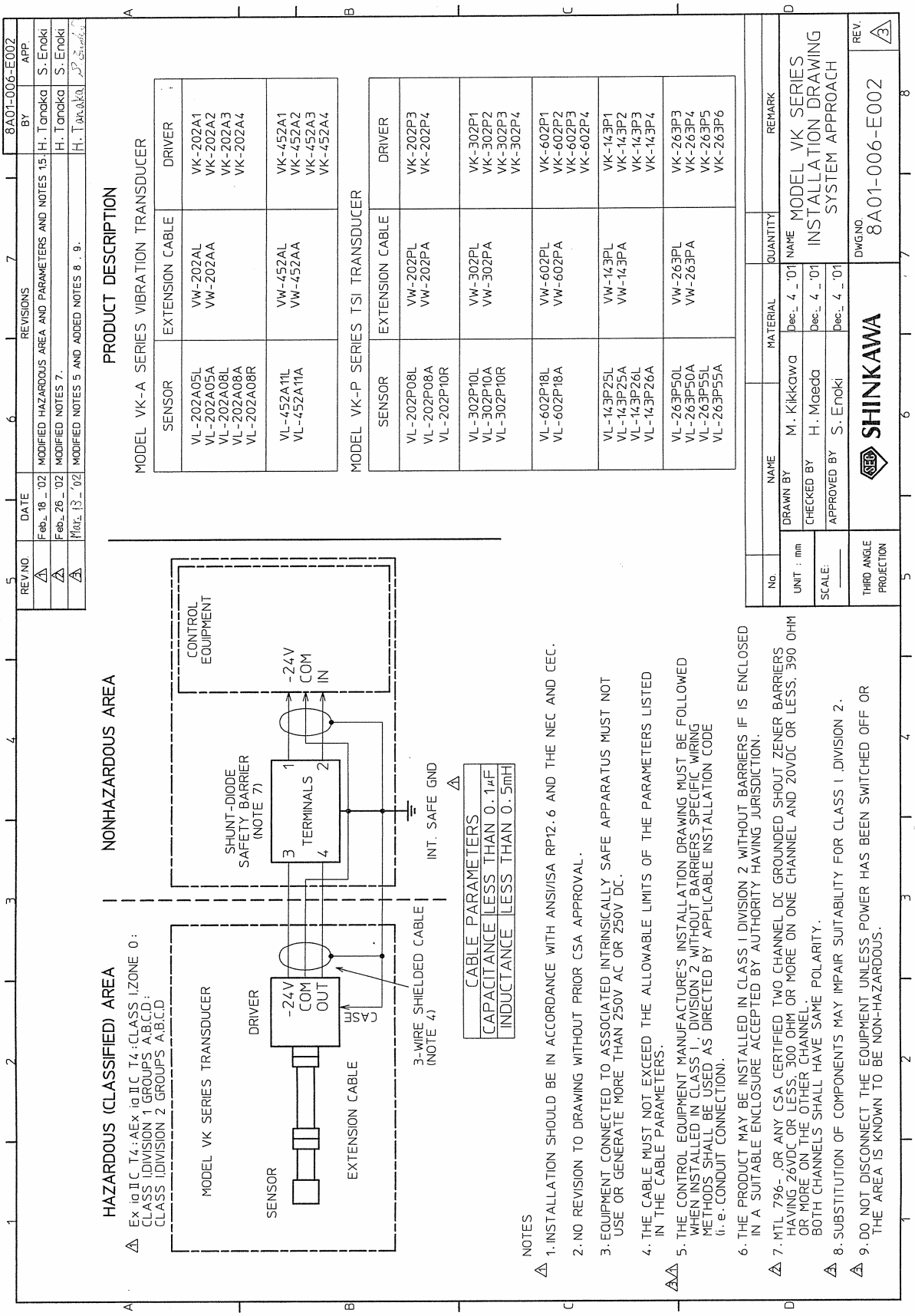
三角法 | 図番 8A03-001-S002 | 改訂 △

8.2 FM

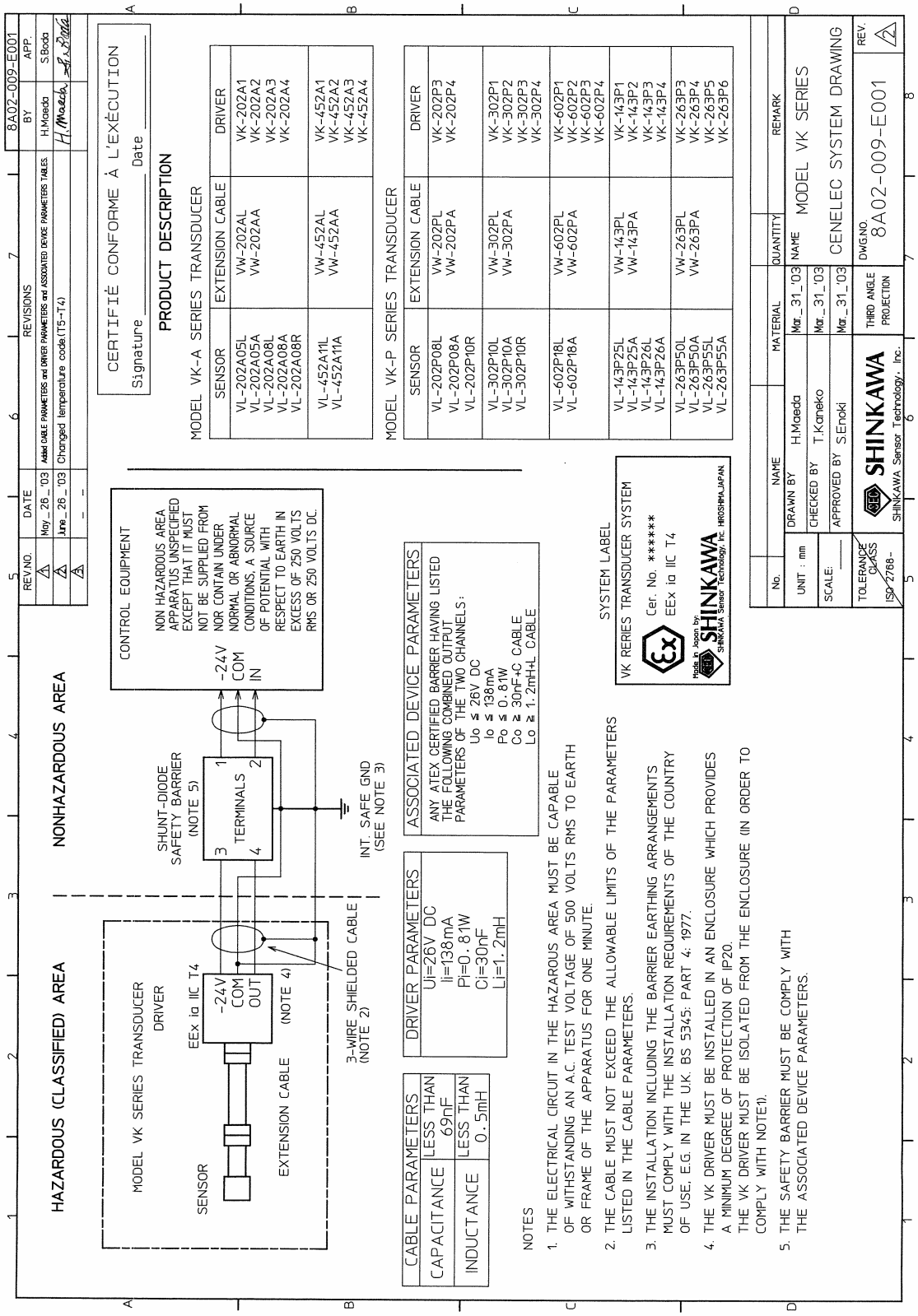

8092-501-E043
REV.NO. DATE REVISIONS BY APP.
Mar.22-'95 Changed K.Motoyama K.Takimoto
Jun.13-'95 Changed K.Motoyama M.Terada
Changed Model No. H.Maeda
PRODUCT DESCRIPTION
Model SVK-A SERIES VIBRATION TRANSDUCER
SENSOR | EXTENSION CABLE | DRIVER
VL-202A05L VL-202A05A VL-202A08L VL-202A08A VL-202A08R | VW-202AL VW-202AA | VK-202A1 VK-202A2
VL-452A11L VL-452A11A | VW-452AL VW-452AA | VK-452A1 VK-452A2
Model SVK-P SERIES TSI TRANSDUCER
SENSOR | EXTENSION CABLE | DRIVER
VL-302P10L VL-302P10A VL-302P10R | VW-302PL VW-302PA | VK-302P1 VK-302P2
VL-602P18L VL-602P18A | VW-602PL VW-602PA | VK-602P1 VK-602P2
VL-143P25L VL-143P25A VL-143P26L VL-143P26A | VW-143PL VW-143PA | VK-143P1 VK-143P2
No. NAME MATERIAL QUANTITY REMARK
DRAWN BY K.Motoyama Oct_21_'93
CHECKED BY T.Ichihara Oct_21_'93
APPROVED BY S.Masaki Oct_21_'93
UNIT mm
SCALE
THIRD ANGLE PROJECTION
SHINKAWA
DWG.NO. 8092-501-E043
REV. A
MODEL SVK SERIES CONTROL DRAWING
(Barrier and control equipment in the same enclosure)
HAZARDOUS (CLASSIFIED) LOCATION
Class I,II,III Division 1
Groups A,B,C,D,E,F,G
Int. Safe or simple apparatus (Note 6)
Model SVK SERIES TRANSDUCER
Model VK SERIES DRIVER
Model VL SERIES SENSOR
Model VW SERIES EXTENSION CABLE
-24V COM OUT
+24V
3-wire shielded cable (Note 7,8)
NONHAZARDOUS LOCATION
Enclosure for barrier and control equipment (Note 9)
Control Equipment (Note 3)
Model MTL796(-) SHUNT-DIODE SAFETY BARRIER
3 Terminals (Note 1)
-24V COM IN
3-wire shielded cable (Note 8)
Int. Safe Gnd (Note 2)
Cable parameters
Cable length 500m
Capacitance 0.1uF
Inductance 0.5mH
NOTES
1.Barrier and control equipment must be installed in an enclosure that meets the requirements of ANSI/ISA S82.01,S82.02 & S82.03.
2.Resistance between Int. Safe Gnd and earth ground most be less than 1 ohm.
3.Control equipment connected to barrier must not use or generate more than 250 V.
4.Installation should be in accordance with ANSI/ISA RP12.6 and the NEC.
5.No revision to drawing without prior FMRC Approval.
6.Intrinsically safe equipment must be FMRC Approved.
7.The cable must not exceed the allowable limits of the parameters listed in the cable parameters.
8.Use cables with AWG No.18 to 14 (0.75mm² to 2mm²) gage stranded conductor.
9.The enclosure shall have the provisions for separate exit of the intrinsically safe wires.
Separate routing of the intrinsically safe wiring inside the enclosure.

8.3 CSA


8A01-006-E001
REV.NO. DATE REVISIONS BY APP.
5 ADDED NOTES 6 AND DRIVER PARAMETERS. M. Kikkawa S. Enoki
4 MODIFIED HAZARDOUS AREA AND PARAMETERS AND NOTES 1,5. H. Tanaka S. Enoki
3 MODIFIED ASSOCIATED DEVICE PARAMETERS. H. Tanaka S. Enoki
2 MODIFIED NOTES 5 AND ADDED NOTES 7 , 8. H. Tanaka S. Enoki
1 CHANGED ASSOCIATED DEVICE PARAMETERS. H. Miyata
PRODUCT DESCRIPTION
MODEL VK-A SERIES VIBRATION TRANSDUCER
SENSOR | EXTENSION CABLE | DRIVER
VL-202A05L, VL-202A05A, VL-202A08L, VL-202A08A, VL-202A08R | VW-202AL, VW-202AA | VK-202A1, VK-202A2, VK-202A3, VK-202A4
VL-452A11L, VL-452A11A | VW-452AL, VW-452AA | VK-452A1, VK-452A2, VK-452A3, VK-452A4
MODEL VK-P SERIES TSI TRANSDUCER
SENSOR | EXTENSION CABLE | DRIVER
VL-202P08L, VL-202P08A, VL-202P10R | VW-202PL, VW-202PA | VK-202P3, VK-202P4
VL-302P10L, VL-302P10A, VL-302P10R | VW-302PL, VW-302PA | VK-302P1, VK-302P2, VK-302P3, VK-302P4
VL-602P18L, VL-602P18A | VW-602PL, VW-602PA | VK-602P1, VK-602P2, VK-602P3, VK-602P4
VL-143P25L, VL-143P25A, VL-143P26L, VL-143P26A | VW-143PL, VW-143PA | VK-143P1, VK-143P2, VK-143P3, VK-143P4
VL-263P50L, VL-263P50A, VL-263P55L, VL-263P55A | VW-263PL, VW-263PA | VK-263P3, VK-263P4, VK-263P5, VK-263P6
HAZARDOUS (CLASSIFIED) AREA
Ex ia II C T4 : AEx ia II C T4 : CLASS I, ZONE 0 ; CLASS I, DIVISION 1 GROUPS A,B,C,D ; CLASS I, DIVISION 2 GROUPS A,B,C,D
NONHAZARDOUS AREA
MODEL VK SERIES TRANSDUCER
SENSOR
DRIVER
-24V COM OUT
EXTENSION CABLE
3-WIRE SHIELDED CABLE (NOTE 4)
CONTROL EQUIPMENT (NOTE 3, 5)
-24V COM IN
CABLE PARAMETERS
CAPACITANCE LESS THAN 0.1μF
INDUCTANCE LESS THAN 0.5mH
DRIVER PARAMETERS
Vi=26V DC
Ii=133mA
Pi=0.75W
Ci=30nF
Li=1.2mH
ASSOCIATED DEVICE PARAMETERS
ANY CSA CERTIFIED BARRIER HAVING LISTED THE FOLLOWING COMBINED OUTPUT PARAMETERS OF THE TWO CHANNELS:
Vo≦26V DC
Io≦133mA
Po≦0.75W
Co≧30nF+C CABLE
Lo≧1.2mH+L CABLE
NOTES
1. INSTALLATION SHOULD BE IN ACCORDANCE WITH ANSI/ISA RP12.6 AND THE NEC AND CEC.
2. NO REVISION TO DRAWING WITHOUT PRIOR CSA APPROVAL.
3. EQUIPMENT CONNECTED TO ASSOCIATED INTRINSICALLY SAFE APPARATUS MUST NOT USE OR GENERATE MORE THAN 250V AC OR 250V DC.
4. THE CABLE MUST NOT EXCEED THE ALLOWABLE LIMITS OF THE PARAMETERS LISTED IN THE CABLE PARAMETERS.
5. THE CONTROL EQUIPMENT MANUFACTURE'S INSTALLATION DRAWING MUST BE FOLLOWED WHEN INSTALLED IN CLASS I, DIVISION 2 WITHOUT BARRIERS. SPECIFIC WIRING METHODS SHALL BE USED AS DIRECTED BY APPLICABLE INSTALLATION CODE (i.e. CONDUIT CONNECTION).
6. THE PRODUCT MAY BE INSTALLED IN CLASS I DIVISION 2 WITHOUT BARRIERS IF IS ENCLOSED IN A SUITABLE ENCLOSURE ACCEPTED BY AUTHORITY HAVING JURISDICTION.
7. SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2.
8. DO NOT DISCONNECT THE EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.
No. NAME MATERIAL QUANTITY REMARK
DRAWN BY H. Tanaka Jul._6_'01
CHECKED BY H. Iemoto Jul._6_'01
APPROVED BY S. Enoki Jul._6_'01
UNIT : mm
SCALE:
THIRD ANGLE PROJECTION
SHINKAWA
NAME MODEL VK SERIES INSTALLATION DRAWING ENTITY APPROACH
DWG.NO. 8A01-006-E001
REV. 5


8A01-006-E002
REVISIONS
REV.NO DATE BY APP.
MODIFIED HAZARDOUS AREA AND PARAMETERS AND NOTES 15. Feb. 18 '02 H. Tanaka S. Enoki
MODIFIED NOTES 7. Feb. 26 '02 H. Tanaka S. Enoki
MODIFIED NOTES 5 AND ADDED NOTES 8 . 9. Mar. 13 '02 H. Tanaka
PRODUCT DESCRIPTION
MODEL VK-A SERIES VIBRATION TRANSDUCER
SENSOR | EXTENSION CABLE | DRIVER
VL-202A05L VL-202A05A VL-202A08L VL-202A08A VL-202A08R | VW-202AL VW-202AA | VK-202A1 VK-202A2 VK-202A3 VK-202A4
VL-452A11L VL-452A11A | VW-452AL VW-452AA | VK-452A1 VK-452A2 VK-452A3 VK-452A4
MODEL VK-P SERIES TSI TRANSDUCER
SENSOR | EXTENSION CABLE | DRIVER
VL-202P08L VL-202P08A VL-202P10R | VW-202PL VW-202PA | VK-202P3 VK-202P4
VL-302P10L VL-302P10A VL-302P10R | VW-302PL VW-302PA | VK-302P1 VK-302P2 VK-302P3 VK-302P4
VL-602P18L VL-602P18A | VW-602PL VW-602PA | VK-602P1 VK-602P2 VK-602P3 VK-602P4
VL-143P25L VL-143P25A VL-143P26L VL-143P26A | VW-143PL VW-143PA | VK-143P1 VK-143P2 VK-143P3 VK-143P4
VL-263P50L VL-263P50A VL-263P55L VL-263P55A | VW-263PL VW-263PA | VK-263P3 VK-263P4 VK-263P5 VK-263P6
HAZARDOUS (CLASSIFIED) AREA
NONHAZARDOUS AREA
Ex ia IIC T4:AEx ia IIC T4:CLASS I.ZONE 0: CLASS I.DIVISION 1 GROUPS A,B,C,D: CLASS I.DIVISION 2 GROUPS A,B,C,D
MODEL VK SERIES TRANSDUCER
SENSOR
DRIVER
-24V COM OUT
EXTENSION CABLE
CASE
3-WIRE SHIELDED CABLE (NOTE 4)
SHUNT-DIODE SAFETY BARRIER (NOTE 7)
TERMINALS 1 2 3 4
CONTROL EQUIPMENT
-24V COM IN
INT. SAFE GND
CABLE PARAMETERS
CAPACITANCE LESS THAN 0.1μF
INDUCTANCE LESS THAN 0.5mH
NOTES
1. INSTALLATION SHOULD BE IN ACCORDANCE WITH ANSI/ISA RP12.6 AND THE NEC AND CEC.
2. NO REVISION TO DRAWING WITHOUT PRIOR CSA APPROVAL.
3. EQUIPMENT CONNECTED TO ASSOCIATED INTRINSICALLY SAFE APPARATUS MUST NOT USE OR GENERATE MORE THAN 250V AC OR 250V DC.
4. THE CABLE MUST NOT EXCEED THE ALLOWABLE LIMITS OF THE PARAMETERS LISTED IN THE CABLE PARAMETERS.
5. THE CONTROL EQUIPMENT MANUFACTURE'S INSTALLATION DRAWING MUST BE FOLLOWED WHEN INSTALLED IN CLASS I, DIVISION 2 WITHOUT BARRIERS SPECIFIC WIRING METHODS SHALL BE USED AS DIRECTED BY APPLICABLE INSTALLATION CODE (i.e. CONDUIT CONNECTION).
6. THE PRODUCT MAY BE INSTALLED IN CLASS I DIVISION 2 WITHOUT BARRIERS IF IS ENCLOSED IN A SUITABLE ENCLOSURE ACCEPTED BY AUTHORITY HAVING JURISDICTION.
7. MTL 796- ,OR ANY CSA CERTIFIED TWO CHANNEL DC GROUNDED SHOUT ZENER BARRIERS HAVING 26VDC OR LESS, 300 OHM OR MORE ON ONE CHANNEL AND 20VDC OR LESS, 390 OHM OR MORE ON THE OTHER CHANNEL. BOTH CHANNELS SHALL HAVE SAME POLARITY.
8. SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I .DIVISION 2.
9. DO NOT DISCONNECT THE EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.
NAME MATERIAL QUANTITY REMARK
DRAWN BY M. Kikkawa Dec._4_'01
CHECKED BY H. Maeda Dec._4_'01
APPROVED BY S. Enoki Dec._4_'01
UNIT : mm
SCALE: ——
THIRD ANGLE PROJECTION
SHINKAWA
NAME MODEL VK SERIES INSTALLATION DRAWING SYSTEM APPROACH
DWG NO. 8A01-006-E002
REV. 3

8.4 ATEX


HAZARDOUS (CLASSIFIED) AREA
NONHAZARDOUS AREA
MODEL VK SERIES TRANSDUCER
DRIVER
EEx ia IIC T4
-24V
COM
OUT
SENSOR
EXTENSION CABLE (NOTE 4)
3-WIRE SHIELDED CABLE (NOTE 2)
SHUNT-DIODE SAFETY BARRIER (NOTE 5)
TERMINALS
-24V
COM
IN
INT. SAFE GND (SEE NOTE 3)
CONTROL EQUIPMENT
NON HAZARDOUS AREA APPARATUS UNSPECIFIED EXCEPT THAT IT MUST NOT BE SUPPLIED FROM NOR CONTAIN UNDER NORMAL OR ABNORMAL CONDITIONS, A SOURCE OF POTENTIAL WITH RESPECT TO EARTH IN EXCESS OF 250 VOLTS RMS OR 250 VOLTS DC
CERTIFIÉ CONFORME À L'EXÉCUTION
Signature _____ Date _____
PRODUCT DESCRIPTION
MODEL VK-A SERIES TRANSDUCER
MODEL VK-P SERIES TRANSDUCER
SYSTEM LABEL
VK RERIES TRANSDUCER SYSTEM
Cer. No. ******
EEx ia IIC T4
Made in Japan by SHINKAWA Sensor Technology, Inc. HIROSHIMA JAPAN
CABLE PARAMETERS
CAPACITANCE LESS THAN 69nF
INDUCTANCE LESS THAN 0.5mH
DRIVER PARAMETERS
Ui=26V DC
Ii=138mA
Pi=0.81W
Ci=30nF
Li=1.2mH
ASSOCIATED DEVICE PARAMETERS
ANY ATEX CERTIFIED BARRIER HAVING LISTED THE FOLLOWING COMBINED OUTPUT PARAMETERS OF THE TWO CHANNELS:
Uo ≤ 26V DC
Io ≤ 138mA
Po ≤ 0.81W
Co ≥ 30nF+C CABLE
Lo ≥ 1.2mH+L CABLE
NOTES
1. THE ELECTRICAL CIRCUIT IN THE HAZARDOUS AREA MUST BE CAPABLE OF WITHSTANDING AN A.C. TEST VOLTAGE OF 500 VOLTS RMS TO EARTH OR FRAME OF THE APPARATUS FOR ONE MINUTE.
2. THE CABLE MUST NOT EXCEED THE ALLOWABLE LIMITS OF THE PARAMETERS LISTED IN THE CABLE PARAMETERS.
3. THE INSTALLATION INCLUDING THE BARRIER EARTHING ARRANGEMENTS MUST COMPLY WITH THE INSTALLATION REQUIREMENTS OF THE COUNTRY OF USE, E.G. IN THE U.K. BS 5345: PART 4: 1977.
4. THE VK DRIVER MUST BE INSTALLED IN AN ENCLOSURE WHICH PROVIDES A MINIMUM DEGREE OF PROTECTION OF IP20. THE VK DRIVER MUST BE ISOLATED FROM THE ENCLOSURE (IN ORDER TO COMPLY WITH NOTE1).
5. THE SAFETY BARRIER MUST BE COMPLY WITH THE ASSOCIATED DEVICE PARAMETERS.
REVISIONS
REV.NO. DATE BY APP.
A May._26_'03 Added CABLE PARAMETERS and DRIVER PARAMETERS and ASSOCIATED DEVICE PARAMETERS TABLES. H.Maeda S.Boda
B June._26_'03 Changed temperature code.(T5→T4) H.Maeda
C _ _
8A02-009-E001
NAME MATERIAL QUANTITY REMARK
DRAWN BY H.Maeda May._31_'03
CHECKED BY T.Kaneko May._31_'03
APPROVED BY S.Enoki May._31_'03
UNIT : mm
SCALE: ____
TOLERANCE CLASS ISO 2768-
SHINKAWA Sensor Technology, Inc.
THIRD ANGLE PROJECTION
NAME MODEL VK SERIES
CENELEC SYSTEM DRAWING
DWG.NO. 8A02-009-E001
REV. C

8.5 NEPSI (Chinese Only)

国家级仪器仪表防爆安全监督检验站

National Supervision and Inspection Centre for Explosion Protection and Safety of Instrumentation

(GYJ05307) **(Attachment Ⅰ)**

GYJ05307防爆合格证附件Ⅰ

由日本新川传感器技术公司生产的SVK-202A系列涡流式非接触型振动计（以下简称“振动计”），经国家级仪器仪表防爆安全监督检验站(NEPSI)检验，符合下列防爆标准规定的要求：

GB3836.1-2000“爆炸性气体环境用电气设备 第1部分：通用要求”

GB3836.4-2000“爆炸性气体环境用电气设备 第4部分：本质安全型“i””

产品防爆标志为Ex ia Ⅱ CT6，防爆合格证号为GYJ05307。

产品由传感器、延长电缆以及放大器三部分组成，各组成部分的型号规格说明如下：

•传感器：

VL-202A [1][2]-[3][4][5][6]/EX7

	[1]	[2]	[3]	[4]	[5]	[6]
代码含义	传感器探头直径	传感器类型	螺纹规格	非螺纹部分的长度	螺纹部分长度	传感器全部长度
可选代码	05	L A	1 2 9	0 1～B 9	0～3 4～8 A B C 9	1 2 3 4 5 6 7 8 9 A
	08	L A	1 2 9	0 1～B 9		
		R	1 2 3 9	0 9		

•延长电缆：

VW-202A [1]-[2]/EX7

[1]代码：代表有无挠性护套，可选代码包括L和A；

[2]代码：代表电缆长度，可选代码包括1、2、3、4、5、6、7、8、A、B、C、9。

(GYJ05307) **(Attachment Ⅰ)**

•放大器:

VK-202A [1] /EX7

[1] 代码：代表系统电缆长度，可选代码包括1、3、2、4。

一、产品使用注意事项

1. 产品最高使用环境温度为：+60℃。

2. 振动计必须与置于非危险场所的关联设备配套共同组成本安防爆系统方可使用于现场存在爆炸性气体混合物的危险场所。其系统接线必须同时遵守振动计和所配关联设备的使用说明书要求，接线端子不得接错。

2.1 振动计本安参数及最大内部等效参数如下：

最高输入电压 Ui (V)	最大输入电流 Ii (mA)	最大输入功率 Pi (mW)	最大内部等效参数	
			Ci(μF)	Li(mH)
26	138	810	0.026	1.188

2.2 振动计与关联设备共同构成本安防爆系统时，必须同时满足下列要求：

$U_o \leq U_i$、$I_o \leq I_i$、$P_o \leq P_i$、$C_o \geq C_i + C_c$、$L_o \geq L_i + L_c$。

注：Uo、Io、Po、Co和Lo分别代表关联设备的本安输出参数及外部允许参数；

Cc和Lc分别代表连接电缆的分布电容和电感。

2.3 振动计与关联设备的连接电缆应为屏蔽电缆（必须有绝缘护套），同时应满足关联设备接地、屏蔽层接地以及产品外壳保持等电位平衡。

3. 用户不得自行更换该产品的零部件，应会同产品制造商共同解决运行中出现的故障，以杜绝损坏现象的发生。

4. 产品的安装、使用和维护应同时遵守产品说明书、GB3836.13-2003“爆炸性气体环境用电气设备 第13部分：爆炸性气体环境用电气设备的检修” GB3836.15-2000“爆炸性气体环境用电气设备 第15部分：危险场所电气安装（煤矿除外）”及GB50257-1996“电气装置安装工程爆炸和火灾危险环境 电气装置施工及验收规范”的有关规定。

二、制造厂责任

1. 产品制造厂必须将上述使用注意事项纳入该产品使用说明书；

2. 制造厂必须严格按照NEPSI认可的文件资料生产；

(GYJ05307) (Attachment Ⅰ)

3. 产品铭牌中必须具有下列内容：

(1) NEPSI认可标志(见防爆合格证书)

(2) 产品防爆标志

(3) 防爆合格证号

(4) 使用环境温度

国家级仪器仪表防爆安全监督检验站

二OO五年八月二十三日

9. TABLE OF MODEL CODE

●Driver

VK-202A □ - / EX □ / SYS / GEO / CEM
A B C D E

A		B		C	D	E
System cable length		Intrinsically safe		System calibration	Geothermal spec.	CE marking
1	5m	1	TIIS (IEC)			
2	9m	2	FM			
3	5m	4	CSA			
4	9m	5	ATEX			
		7	NEPSI			

● Extension Cable

VW-202A □ - □ / EX □ / GEO
A B C D

A		B		C		D
Armor		Cable length		Intrinsic safety		Geothermal Spec.
A	With	1	2.0m	1	TIIS (IEC)	
L	Without	2	3.0m	2	FM	
		3	4.0m	4	CSA	
		4	4.5m	5	ATEX	
		6	6.0m	7	NEPSI	
		7	7.0m			
		8	8.0m			
		A	8.5m			
		B	3.5m			
		C	7.5m			

● Sensor

VL-202A05 □ - □ □ □ □ / EX □ / GEO / WPF
A B C D E F G H

A		B		C		D		E		F		G	H
Armor		Threaded Size		Unthreaded Length (L3)		Threaded Length(L1)		Cable Length(L2)		Intrinsic Safety		Geothermal Spec.	Water -proof
A	With	1	M8 X 1	0	3mm	0	20mm	1	0.5m	1	TIIS (IEC)		
L	Without	2	1/4-28UNF※1)	1	10mm	1	30mm	2	1.0m	2	FM		
				2	20mm	2	40mm	3	2.0m	4	CSA		
				3	30mm	3	50mm	4	3.0m	5	ATEX		
				4	40mm	4	70mm	5	5.0m	7	NEPSI		
				5	50mm	5	100mm	6	6.0m				
				6	60mm	6	130mm	7	7.0m				
				7	70mm	7	160mm	8	9.0m				
				8	80mm	8	190mm	A	1.5m				
				A	90mm	A	210mm						
				B	100mm	B	250mm						
				Min.Length ; 3mm Max.Length; 100mm L3+L1 ≦ 253mm		Min.Length ; 20mm Max.Length; 250mm							

※1）VL-202A05□-2:L3+L1≦100mm

9. TABLE OF MODEL CODE

VL-202A08 □ - □ □ □ □ / EX □ / GEO / WPF
A B C D E F G H

A		B		C		D		E		F		G	H
Armor		Threaded Size		Unthreaded Length (L3)		Threaded Length (L1)		Cable Length (L2)		Intrinsic Safety		Geothermal Spec.	Water -proof
A	With	1	M10X 1	0	0mm	0	20mm	1	0.5m	1	TIIS (IEC)		
L	Without	2	3/8-24UNF	1	10mm	1	30mm	2	1.0m	2	FM		
				2	20mm	2	40mm	3	2.0m	4	CSA		
				3	30mm	3	50mm	4	3.0m	5	ATEX		
				4	40mm	4	70mm	5	5.0m	7	NEPSI		
				5	50mm	5	100mm	6	6.0m				
				6	60mm	6	130mm	7	7.0m				
				7	70mm	7	160mm	8	9.0m				
				8	80mm	8	190mm	A	1.5m				
				A	90mm	A	210mm						
				B	100mm	B	250mm						
				Min.Length ; 0mm Max.Length; 100mm L3+L1 ≦ 250mm		Min.Length ; 20mm Max.Length; 250mm							

VL-202A08R - □ □ □ □ / EX □ / GEO / WPF
A B C D E F G

A		B		C		D		E		F	G
Threaded Size		Unthreaded Length (L3)		Threaded Length (L1)		Cable Length (L2)		Intrinsic Safety		Geothermal Spec.	Water -proof
1	M10X 1	0	7mm	0	20mm	1	0.5m	1	TIIS (IEC)		
2	3/8-24UNF	1	10mm	1	30mm	2	1.0m	2	FM		
		2	20mm	2	40mm	3	2.0m	4	CSA		
		3	30mm	3	50mm	4	3.0m	5	ATEX		
		4	40mm	4	70mm	5	5.0m	7	NEPSI		
		5	50mm	5	100mm	6	6.0m				
		6	60mm	6	130mm	7	7.0m				
		7	70mm	7	160mm	8	9.0m				
		8	80mm	8	190mm	A	1.5m				
		A	90mm	A	210mm						
		B	100mm	B	250mm						
		Min.Length; 5mm Max.Length;100mm L3+L1 ≦ 255mm		Min.Length; 20mm Max.Length; 250mm							

Warranty

The warranty period for the delivered product shall be 3 years from the date of delivery from our factory. But the warranty period for the special order product and software shall be 1 year, and for the repairing parts shall be 6 months. In the event that the delivered product develops any defects within the warranty period for which Shinkawa Electric is liable, the defective part will be replaced or repaired in our factory at our own expense.

In the event that an engineer needs to be dispatched for repair purposes during the warranty period, travel expenses for the said engineer will be changed in accordance with the above item. The cost of repair will be borne by Shinkawa Electric.

However, the following are excluded from our warranty:

(1) Any defects due to improper handling or operation by the user.
(2) Any defects, the case of which is not attributable to Shinkawa Electric.
(3) Any modifications or repairs made by others then Shinkawa Electric or persons commissioned by Shinkawa Electric.
(4) Any handling, storage and operation under severe environmental conditions that exceed the design specifications.
(5) Any defects due to fire, flood, earthquake, lightning and other Acts of God.
(6) The consumables
(7) Other defects considered not to be attributable to Shinkawa Electric.

This warranty applies exclusively to the delivered product units.

Shinkawa Electric will not be held liable for consequential damage caused either directly or indirectly through a defect of the delivered product.

The warranty period and scope of machinery and equipment made by manufacturers other than Shinkawa Electric shall be in accordance with the conditions of the respective manufacturer, regardless of the provisions made above.

SHINKAWA

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