DOUBLE CONTACT THERMOMETER – TOP COVER MOUNTED

Description and General Specifications

This instrument is designed to control temperature in oil filled TRANSFORMERS.
All parts are made of non-corrosive or surface treated material. It is used for alarm and control function. This instrument is equipped with Electric Contact (magnetic snap-action contact type) with a little magneto to avoid uncertain commutation when the instrument is subject to vibration.

Type	: Straight type (S type)
Casing	: Stainless Steel (SUS 304)
Cover/locking ring	: Stainless Steel (SUS 304)
Size	: 75 Ø mm
Temperature Range	: 0 ~ 120 ^{o}C, c/w Max pointer
Ambient temp	: -30 / + 70^{o}C
Contacts	: Magnetic snap-action contact type
Insulation test	: 3 kV 90s
Protection degree	: IP 54
Class (Accuracy)	: ± 2% FS
Operating system	:

Upper and upper limit system :

OFF	ON		OFF	ON	
0	SET	MAX	0	SET	MAX

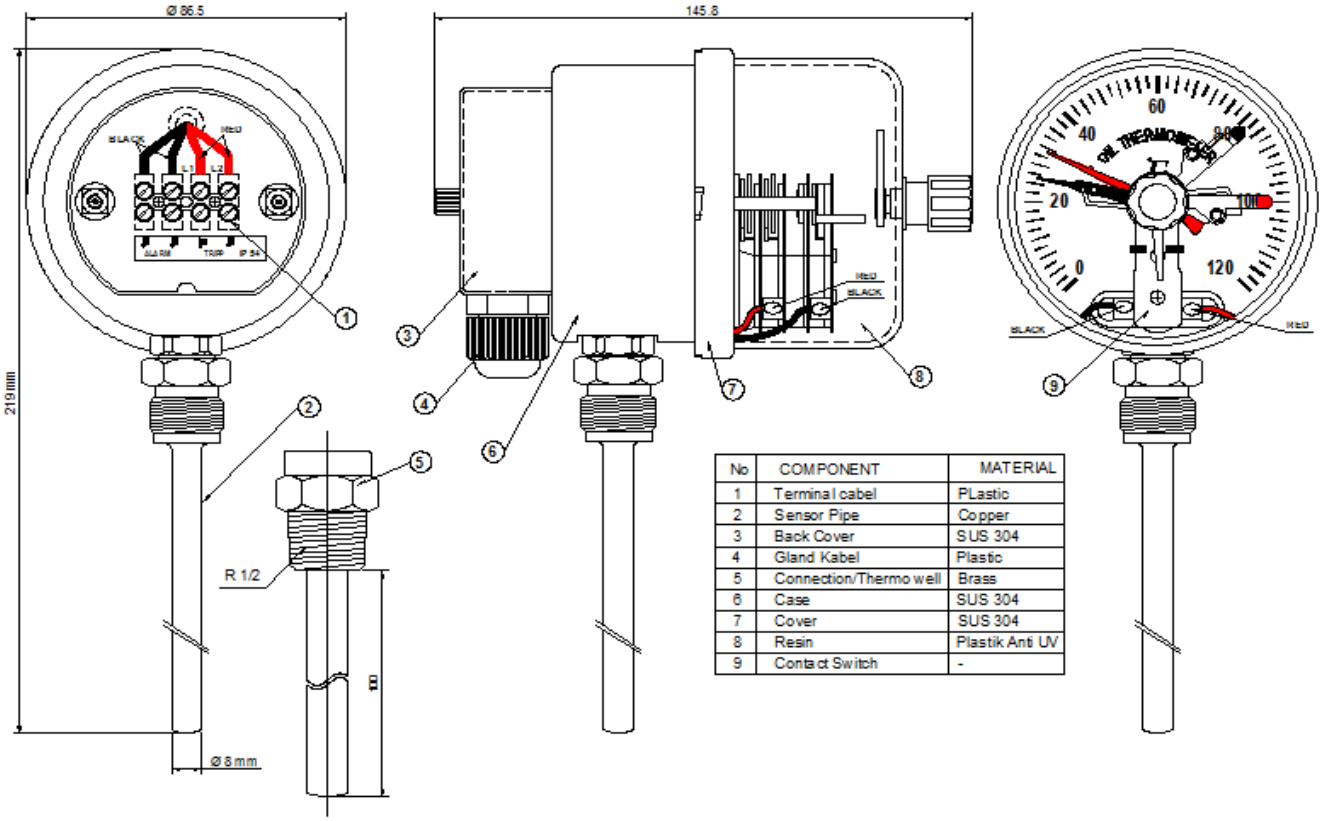
Length of sensor	: Standard 90 mm (max. length 300 mm)
Dimension of sensor	: Standard 8Ø x 90 mm
Material of sensor	: Copper with Ni Plated
Window	: Acrilic with Anti UV 5%
Connecting thread	: R ½, R ¾ (union type)
Option	: Thermo well

ELECTRICAL CONTACTS CAPACITY					
Sliding contact type			**Magnetic snap-action contact type**		
Volt	**Resistance Load**	**Inductive Load**	**Volt**	**Resistance Load**	**Inductive Current**
AC110V	0.4A	0.05A	AC110V	0.4A	0.05A
AC220V	0.2A	0.025A	AC220V	0.2A	0.025A
DC110V	0.02A		DC110V	0.02A	
DC220V	0.01A		DC220V	0.01A	

Insulation test : 3000 volt (3 kV) 50 Hz between terminals and earth for a 90 second time and carried out by means of a Die-Electric Test Machine.

Mechanical Protection Degree : IP 54.

Measuring Accuracy : ± 2% of full scale value

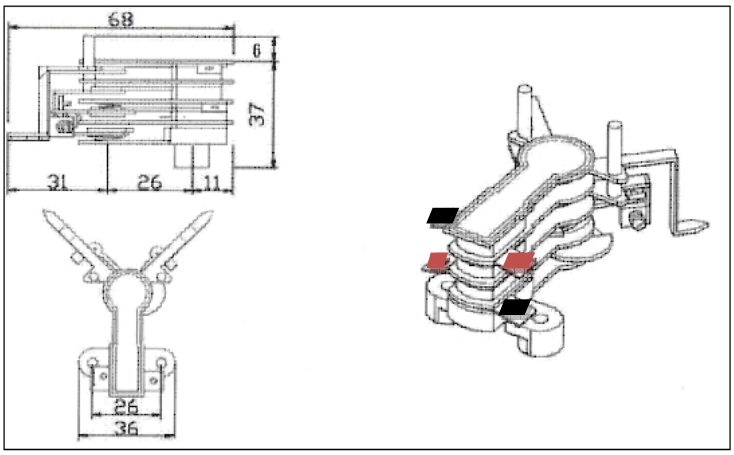


No	COMPONENT	MATERIAL
1	Terminal cabel	PLastic
2	Sensor Pipe	Copper
3	Back Cover	SUS 304
4	Gland Kabel	Plastic
5	Connection/Thermo well	Brass
6	Case	SUS 304
7	Cover	SUS 304
8	Resin	Plastik Anti UV
9	Contact Switch	-

Operating Instruction and Maintenance

Operating Instructions :
Mounting :
Fixed the connection on the thermometer connection (pocket) by means of a spanner. Attention do not try to tighten the connection by twist the thermometer dial (head) as you may damage it ! Once the connection is fixed you may need to position the dial to get the best readability, The positoning can be made by means of the swivel nut of the thermometer.

Contact Setting :
Remove the cover and Window by turn anti clockwise, then rotate the frictioned setting pointers till are positioned at the desired set points value. Put the cover and window into its seat taking care that sealing rubber is correctly located under the screw of cover.



- Black color (alarm contact)
- Red color (tripping contact)

Maintenance :

No particular maintenance is riquired. Only, on regular basis, schedule inspections to verify correct function and calibration. Typically a check of the precision must be done after 24 months and the check for contact functionality must be done at least once a year.
In case the acrilic is dirthy, thus reducing the readability of the dial, you can clean it with a soft cloth, water and soap.

Finnish goods quality control tests.

Instrument Calibration : carried out through thermostatic bath

The procedure varies according to instruments scale.
The calibration procedure, being the thermometer scale = 0/+120^{o}C is made by using 4 different bath set at the following temperatures :

Bath 1 = 10^{o}C
Bath 2 = 20^{o}C
Bath 3 = 40^{o}C
Bath 4 = 120^{o}C

Performance Test

Reading Test

The reading test of the thermometers shall be made in accordance with the following:

1). Test conditions

a) The ambient condition shall be an arbitrary condition within the standard temperature condition of grade 4 (20 ± 15^{o}C) and standard humidity condition of grade 3 (65% ± 20%). Given JIS Z 8703.

b) The temperature sensor shall be immersed into the liquid at least minimum to the limmit of lenght of bimetallic spiral.

c) The reading test of the thermometer shall generally be carried out by comparing with the reference thermometer.

d) The inside of the hot bath used for the test shall be stirred well to keep the temperature distribution within the range of ± 0.1^{o}C

2). Tests

a). Take readings after the readings of the thermometer have stabilized at scale values near the minimum and maximum scale values at the measuring range and at arbitrary two scale values between the minimum and maximum scale value. At the same time, take the readings of the reference thermometer. The differences shall be defined as the errors.
The test shall be carried out in both processing of increasing and decreasing temperature.

b). The thermometer may be tested after the pointer is adjusted within the tolerance at a temperature by means of the reference thermometer.

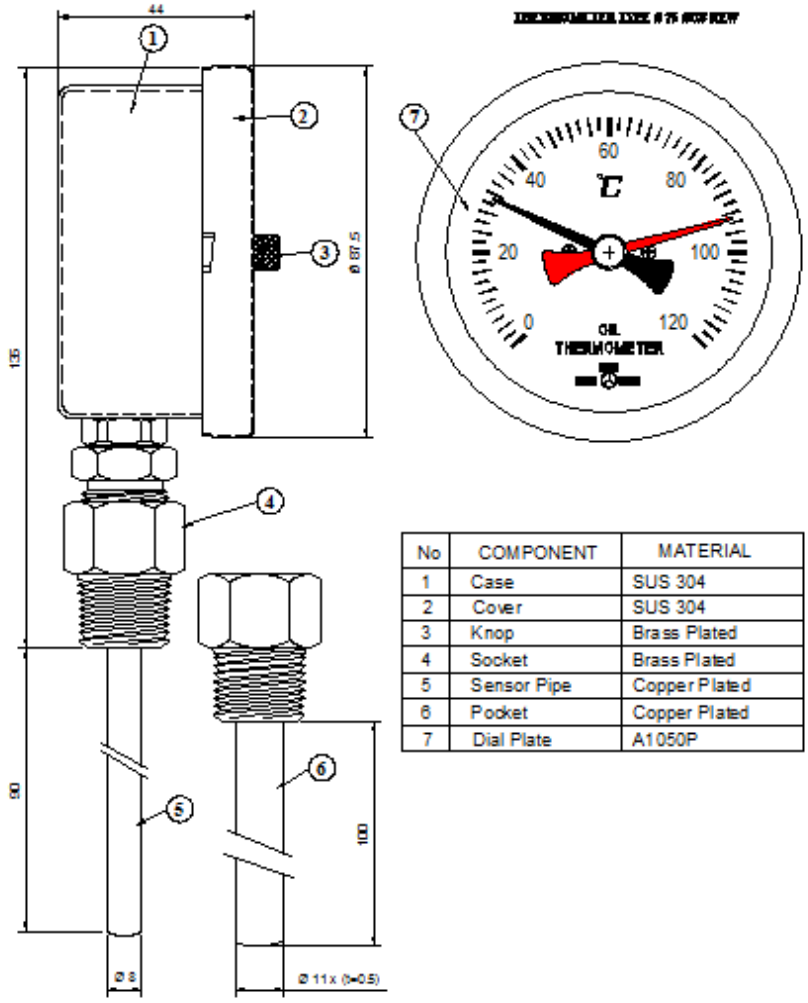
BIMETALLIC THERMOMETER – With Max Pointer

Description and General Specifications

Yamamoto maximum thermometer is designed for smaller distribution transformers without cooling or alarm functions. All have a reset able maximum pointer.

In standard form they are available for front or top mounting, and can be fitted with different connection threads to suit different installation requirements.

Type	: Straight type (S type)
Casing	: Stainless Steel (SUS304)
Cover/locking ring	: Stainless Steel (SUS304)
Size	: 75 Ø mm
Temperature Range	: 0 ~ 120 deg C, c/w Max pointer
Ambient temp	: -30 / + 70^{o}C
Protection degree	: IP 54
Class / Accuracy	: ± 2% FS
Window	: Glass
Length of sensor	: Standard 90 mm (max. length 300 mm)
Dimension of sensor	: Standard 8Ø x 90 mm
Material of sensor	: Copper with Ni Plated
Connecting thread	: R ½, R ¾
Option	: Thermo well



No	COMPONENT	MATERIAL
1	Case	SUS 304
2	Cover	SUS 304
3	Knop	Brass Plated
4	Socket	Brass Plated
5	Sensor Pipe	Copper Plated
6	Pocket	Copper Plated
7	Dial Plate	A1050P

Operating Instruction and Maintenance

Operating Instructions :
Mounting :
Fixe the connection on the thermometer connection (pocket) by means of a spanner. Attention do not try to tighten the connection by twist the thermometer dial (head) as you may damage it ! Once the connection is fixed you mae need to position the dial to get the best readability, The positoning can be mad by means of the swivel nut of the thermometer.

Maintenance :

No particular maintenance is riquired. Only, on regular basis, schedule inspections to verify correct function and calibration. Typically a check of the precision must be done after 24 months and the check for contact functionality must be done at least once a year.
In case the acrilic is dirthy, thus reducing the readability of the dial, you can clean it with a soft cloth, water and soap.

Finnised goods quality control tests.

Instrument Calibration : carried out through thermostatic bath

The procedure varies according to instruments scale.
The calibration procedure, being the thermometer scale = 0/+120^{o}C is made by using 4 different bath set at the following temperatures :
Bath 1 = 10^{o}C
Bath 2 = 20^{o}C
Bath 3 = 40^{o}C
Bath 4 = 120^{o}C

Performance Test

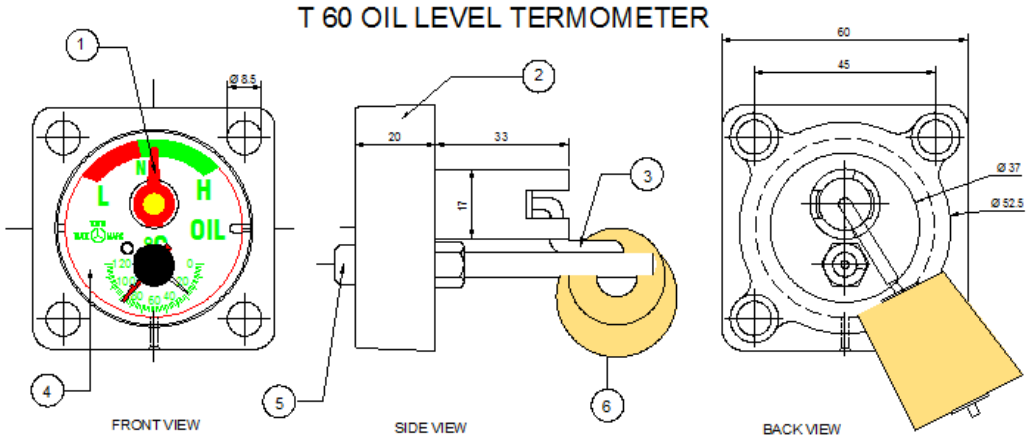
Reading Test
The reading test of the thermometers shall be made in accordance with the following:
1). Test conditions
a) The ambient condition shall be an arbitrary condition within the standard temperature condition of grade 4 (20 ± 15^{o}C) and standard humidity condition of grade 3 (65% ± 20%). Given JIS Z 8703.
b) The temperature sensor shall be immersed into the liquid at least minimum to the limmit of lenght of bimetallic spiral.
c) The reading test of the thermometer shall generally be carried out by comparing with the reference thermometer.
d) The inside of the hot bath used for the test shall be stirred well to keep the temperature distribution within the range of ± 0.1^{o}C

2). Tests
a). Take readings after the readings of the thermometer have stabilized at scale values near the minimum and maximum scale values at the measuring range and at arbitrary two scale values between the minimum and maximum scale value. At the same time, take the readings of the reference thermometer. The differences shall be defined as the errors.
The test shall be carried out in both processing of increasing and decreasing temperature.
b). The thermometer may be tested after the pointer is adjusted within the tolerance at a temperature by means of the reference thermometer.

OIL LEVEL THERMOMETER.

This oil level thermometer are indicates Oil level and Thermometer, side-wall Liquid Level gauge and Thermometer for Distribution Transformers.

Type	: Side-wall type
Size	: 60 x 60 [Aluminum construction]
Temperature Range	: 0 ~ 120 deg C
Float material	: Cork Wood
Dimension of sensor	: Standard 6Ø x 50 mm
Material of sensor	: Copper with Ni Plated



No	Component	Material
01	Red pointer floating	Aluminium coated
02	Case & pipe floating	ADC 12
03	Floating wire	Brass
04	Glass	Glass
05	Knop history	Brass plated
06	Floating	Corck wood

SMALL PRESSURE RELIEF DEVICE (PRD ¼")

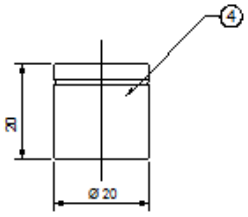
Small PRD is used on small distribution transformers, including pad, pole, and hermetic styles

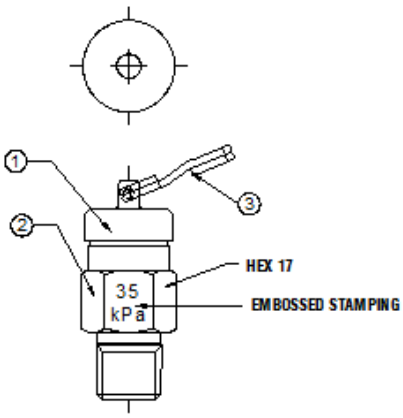
Description :
Standard of PRD ¼" feature a one-piece brass housing. A stainless Steel spring, factory selected to a pre determined rating, is designed to release pressure build-up from within a sealed tank. A NBR O-ring seals the valve. There is a pull ring attached to the valve shaft to allow for manual operation.

Operation :
When gas in the tank exceeds a specified limit, the valve automatically compresses the spring and drives the poppet, breaking the seals and venting potentially dangerous pressure. With the pressure reduced the valve automatically reseals itself to prevent entry of outside air.

PRESSURE RELIEF DEVICE 1/4"

COMPONENT PRESSURE RELIEF DEVICE 1/4 "		
NO	COMPONENT	MATERIAL
01	COVER PRESSURE GAUGE RELIEF DEVICE	C 3604 BD
02	BODY PRESSURE GAUGE RELIEF DEVICE	C 3604 BD
03	PULL RING	SUS 304
04	BASED PRD 1/4 "	SS 400





PRESSURE RELIEF DEVICE (PRD 1")

1" size PRD is used on either medium distribution or small power transformers.

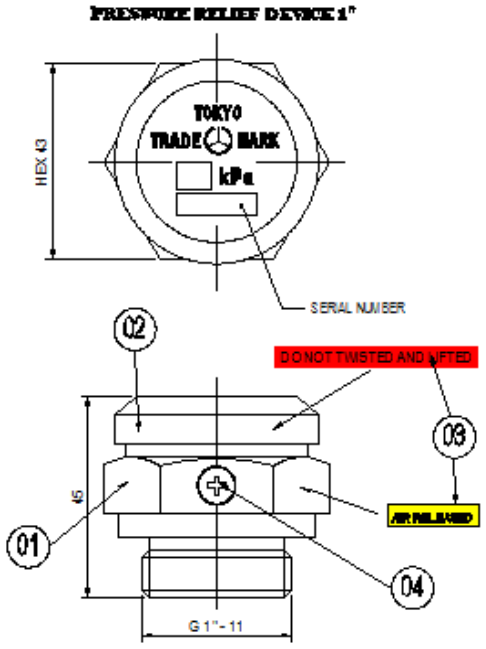
When transformer pressure rises beyond its predetermined limit, you need a pressure relief device you can count on to protect your valuable equipment.

When internal tank pressure rises, the valve within the PRD begins to lift off the top seal. Once pressure is relieved the valve returns quickly to its sealed position.
The NBR sealing ring and the particular design of the Stainless Steel spring and the center rings ensure a safe and steady service and long life.

The NBR sealing ring and the particular design of the steel spring and the center rings ensure a safe and steady service and a long life. The sort tail allow an easy location in any portion of the cover, as it doesn't interfere with the clearance between alive inside the transformer.

Routine test : All of our PRD are tested with transformer oil and sealed before dispatch.

COMPONENT PRD 1"		
NO	COMPONENT	MATERIAL
01	COVER PRD 1"	JIS H 3250 C - 3771 BE
02	BODY PRD 1"	JIS H 3250 C - 3771 BE
03	STICKER SAFETY	-
04	RELEASED BOLT	SUS 304



PRESSURE RELIEF DEVICE (PRD 2")

This kind of valve is a safety component of the transformer worked to prevent heavy damages of the tank in the case of sudden rise of the internal pressure.

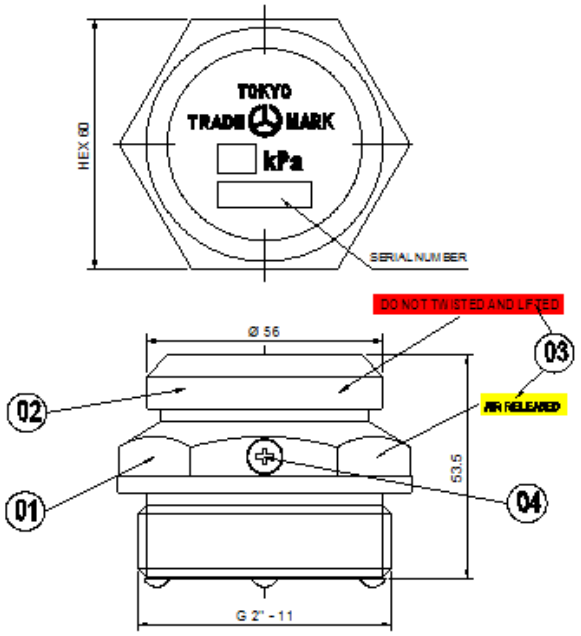
The valve can be presetted at any value within 20 kPa and 70 kPa (value is stamped on the cap of valve). Tolerance of presetting value : +/- 0.2 kPa

The NBR sealing ring and the particular design of the Stainless Steel spring and the center rings ensure a safe and steady service and long life.

The NBR sealing ring and the particular design of the steel spring and the center rings ensure a safe and steady service and a long life. The sort tail allow an easy location in any portion of the cover, as it doesn't interfere with the clearance between alive inside the transformer.

Routine test : All of our PRD are tested with transformer oiland sealed before dispatch.

COMPONENT PRD 2"		
No	COMPONENT	MATERIAL
01	BODY PRD 2"	JIS H 3250 C - 3771 BE
02	COVER PRD 2"	JIS H 3250 C - 3771 BE
03	STICKER SAFETY	-
04	RELEASED BOLT	SUS 304

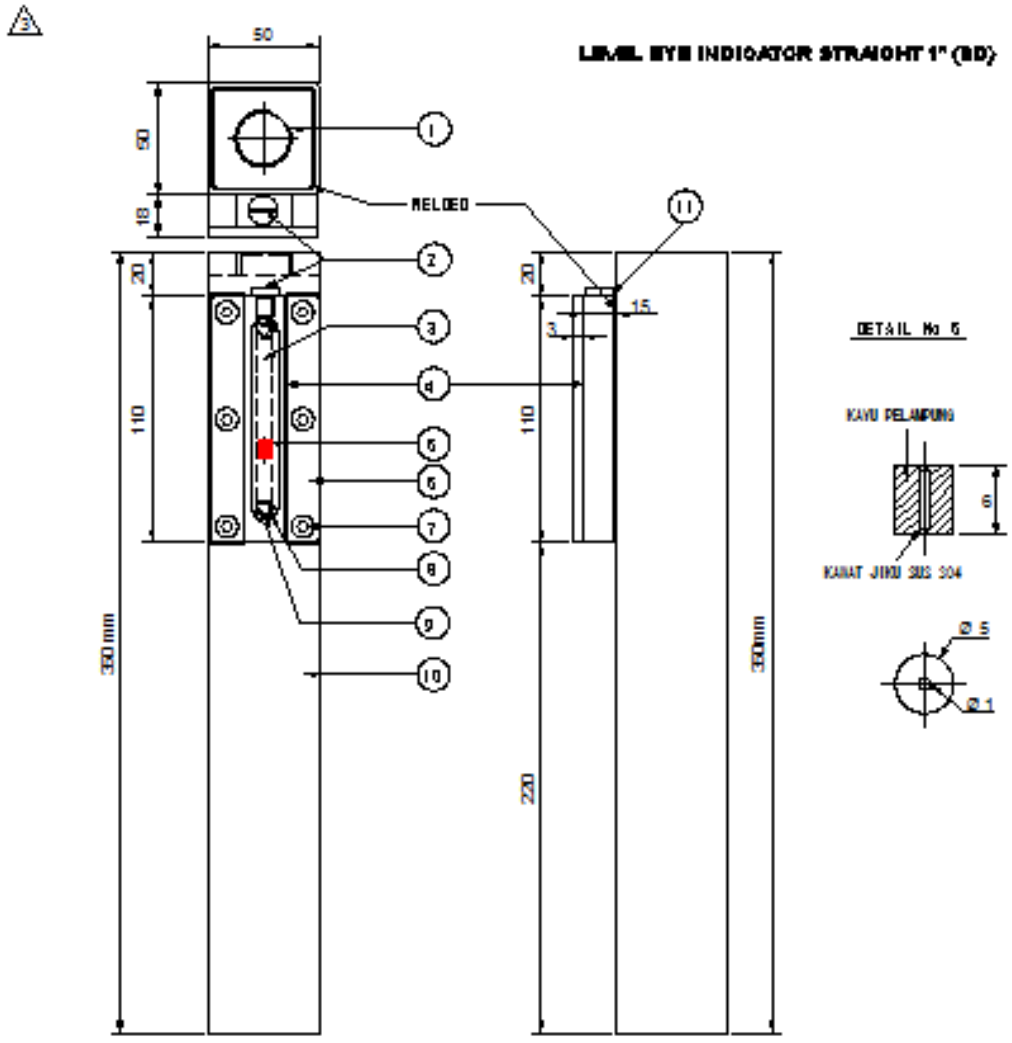


LEVEL EYE INDICATOR 1”

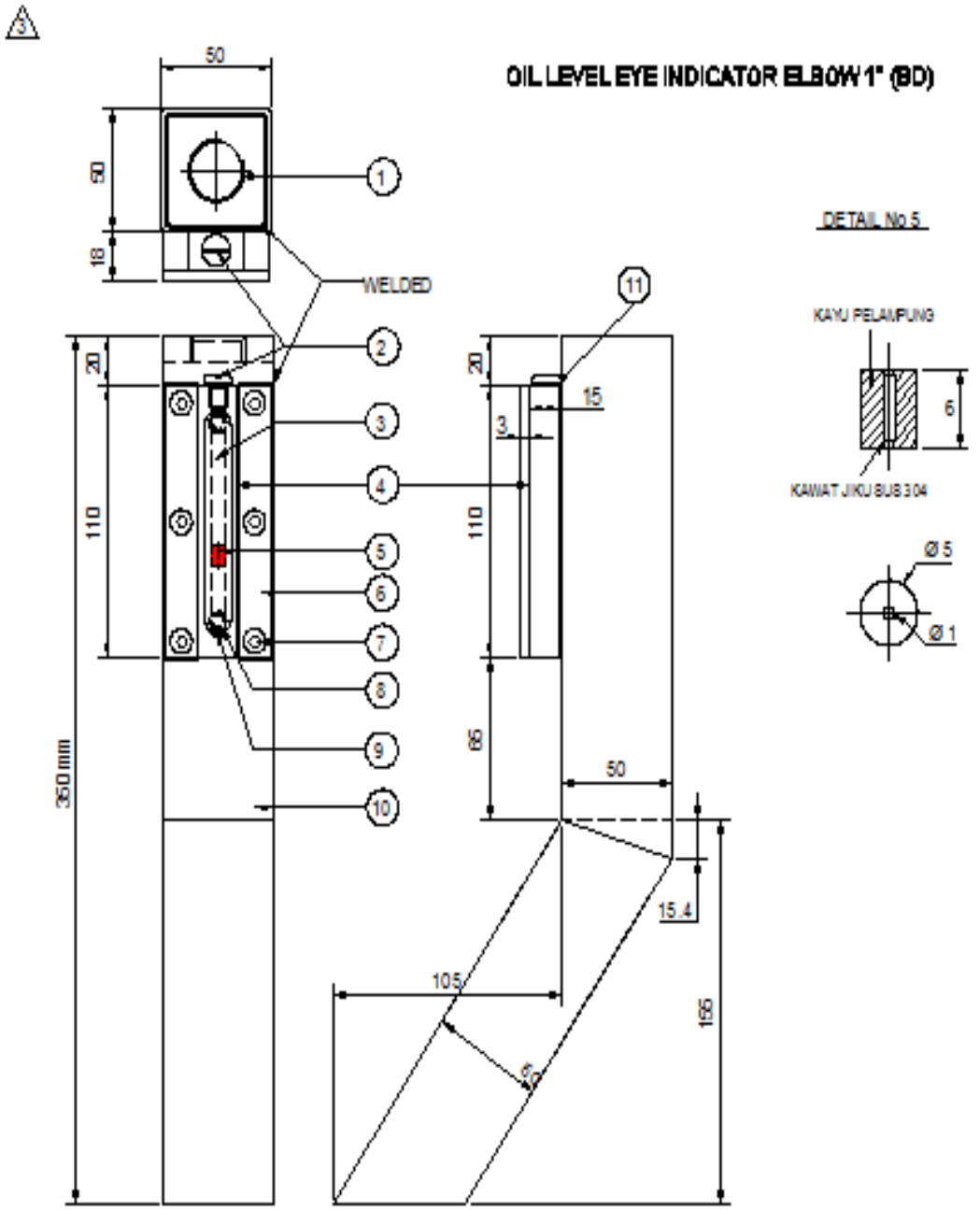
This Product is made of SPHC Steel material. It have 2 types. Straight type and Elbow type.

It is used for measuring Oil level control and used on New Standard of PLN (State Electric Company of Indonesia) No : D3.002-1 : 2007 and on distribution transformer and medium voltage TRANSFORMERS.

ITEM	MATERIAL NAME	SPEC	QTY	REMARK
1	BASE FOR PRESSURE RELIEF VALVE	1" 46.8 x 10	1	INNER THREAD
2	BOLT FOR HOLE PLUG	M 8 x 8	1	BRASS (NI PLATING)
3	OIL LEVEL INDICATOR	15t x 18 x 110	1	ACCRYLIC
4	CLAMPING OF OIL LEVEL INDICATOR	3t x 50 x 110	1	STAINLESS STEELSUS 304
5	FLOATING RED COLOR	Ø 5 x 6 t	1	WOOD / PLASTIC / RUBBER
6	SUPPORT OF OIL LEVEL INDICATOR	15t - 15 x 110	2	SOLID IRON
7	BOLT FOR COVER OF OIL INDICATOR CLAMPING	M 5 x 8	6	SUS 304
8	PIN ACCRYLIC	M 6 x 4	2	BRASS
9	O-RING PACKING /SEAL	O010 x ID 6	2	NEOPRENE OR BETTER
10	BODY OF OIL LEVEL EYE INDICATOR	IRON □ 17-21-50x50x350	1	HOLLOW IRON
11	O-RING PACKING / SEAL	O011 X ID 7	1	NEOPRENE OR BETTER



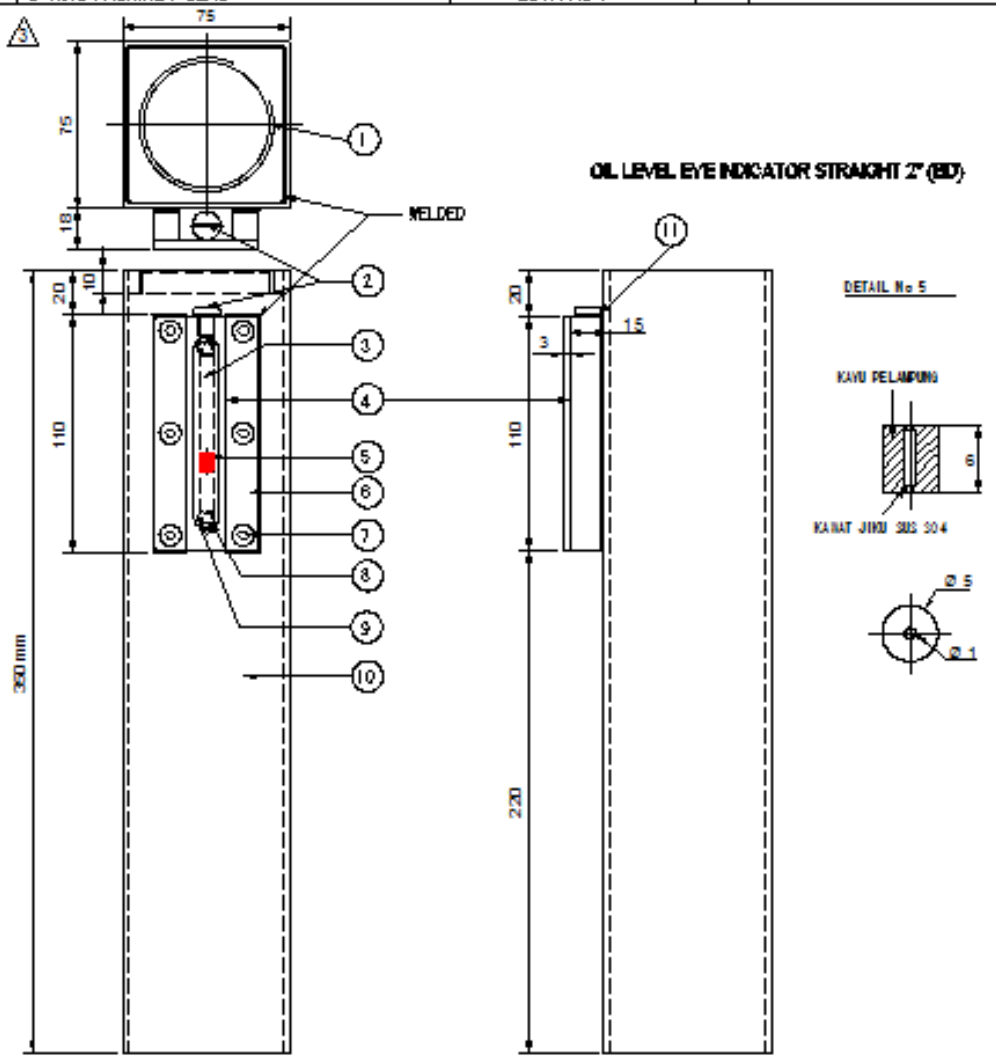
ITEM	MATERIAL NAME	SPEC	QTY	REMARK
1	BASE FOR PRESSURE RELIEF VALVE	1" 46.8 x 10	1	INNER THREAD
2	BOLT FOR HOLE PLUG	M 8 x 8	1	BRASS (NI PLATING)
3	OIL LEVEL INDICATOR	15t x 18 x 110	1	ACCRYLIC
4	CALMPING OF OIL LEVEL INDICATOR	3t x 50 x 110	1	STAINLESS STEELSUS 304
5	FLOATING RED COLOR	Ø 5 x 6 t	1	WOOD / PLASTIC / RUBBER
6	SUPPORT OF OIL LEVEL INDICATOR	15t - 15 x 110	2	SOLID IRON
7	BOLT FOR COVER OF OIL INDICATOR CLAMPING	M 5 x 8	6	SUS 304
8	PIN ACCRYLIC	M 6 x 4	2	BRASS
9	O-RING PACKING /SEAL	OD10 x ID 6	2	NEOPRENE OR BETTER
10	BODY OF OIL LEVEL EYE INDICATOR	IRON □ 1.7-2t-50x50x350	1	HOLLOW IRON
11	O-RING PACKING / SEAL	OD11 X ID 7	1	NEOPRENE OR BETTER



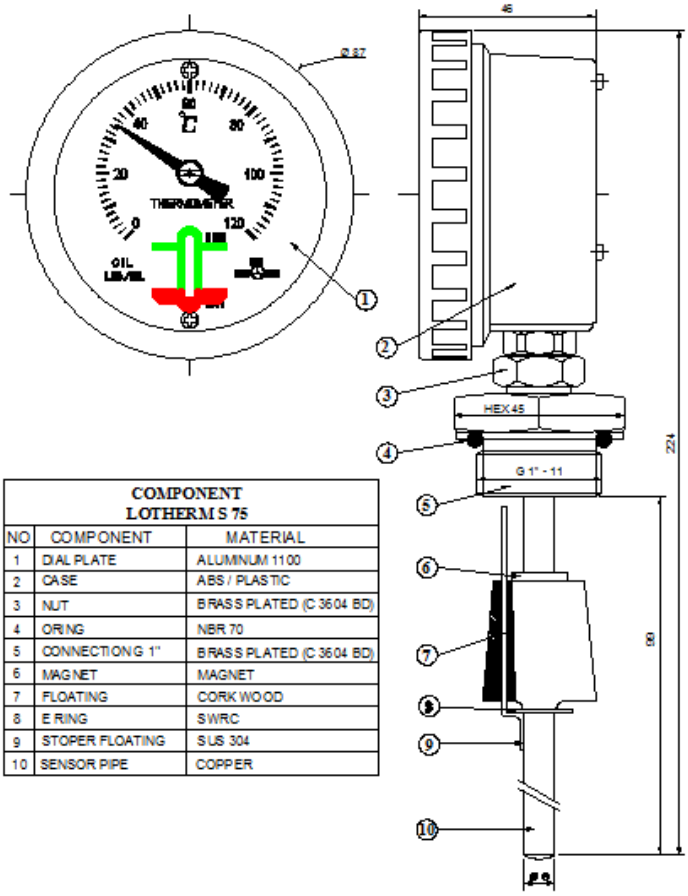
LEVEL EYE INDICATOR STRAIGHT 2”

This product is used for measuring Oil level control and used on New Standard of PLN (State Electric Company of Indonesia) No : D3.002-1 : 2007 and on distribution transformer and medium voltage TRANSFORMERS

ITEM	MATERIAL NAME	SPEC	Q.TY	REMARK
1	BASE FOR PRESSURE RELIEF VALVE	2" 69 x 10	1	INNER THREAD
2	BOLT FOR HOLE PLUG	M 8 x 8	1	BRASS (NIPLATING)
3	OIL LEVEL INDICATOR	15t x 70 x 110	1	ACCRYLIC
4	CALMPING OF OIL LEVEL INDICATOR	3t x 50 x 110	1	STAINLESS STEEL SUS 304
5	FLOATING RED COLOR	Ø 5 x 6 t	1	WOOD / PLASTIC / RUBBER
6	SUPPORT OF OIL LEVEL INDICATOR	15t - 15 x 110	2	SOLID IRON
7	BOLT FOR COVER OF OIL INDICATOR CLAMPING	M 5 x 8	6	SUS 304
8	PIN ACCRYLIC	M 6 x 4	2	BRASS
9	O-RING PACKING / SEAL	OD10 x ID 6	2	NEOPRENE OR BETTER
10	BODY OF OIL LEVEL EYE INDICATOR	IRON □1.8-2.5t-75X75X350	1	HOLLOW IRON
11	O-RING PACKING / SEAL	OD11 X ID 7	1	NEOPRENE OR BETTER



LEVEL OIL THERMOMETER (LOTHERM S75)



COMPONENT LOTHERM S 75		
NO	COMPONENT	MATERIAL
1	DIAL PLATE	ALUMINUM 1100
2	CASE	ABS / PLASTIC
3	NUT	BRASS PLATED (C 3604 BD)
4	ORING	NBR 70
5	CONNECTIONG 1"	BRASS PLATED (C 3604 BD)
6	MAGNET	MAGNET
7	FLOATING	CORK WOOD
8	E RING	SWRC
9	STOPER FLOATING	SUS 304
10	SENSOR PIPE	COPPER

This oil level thermometer are indicates Oil level and Thermometer, same with Oil level thermometer ST-60 [60x60], but different position of installation. “LOTHERM S75 is “on-cover position”. This product also used for Distribution Transformers.

Technical data :

Type	: Straight type
Casing	: ABS (plastic)
Size	: 75 Ø mm
Temperature Range	: 0 ~ 120 deg C
Protection degree	: IP 54
Class	: ± 2% FS
Length of sensor	: Standard 66 mm (max. length 300 mm)
Dimension of sensor	: Standard 8Ø x 66 mm
Material of sensor	: Copper
Connecting thread	: G 1” – 11