

SHICO.

MODEL : SH-BRM

B.R.M [Ball Recirculating Monitoring System]

■ Feature

- Indication of required basic ball charge.
- Indication of recirculating ball quantity.
- Limit Value preset for signal : "ball recirculation quantity low"
- 3time counters for operating hours.
 - total cleaning system operating hours.
 - cleaning system operating hours with sufficient number of recirculation balls.
 - cleaning system operating hours with insufficient number of recirculation balls.
- Current status indication
- Manual ball counting no longer required.
- Ball consumption

■ SPECIFICATION

MOUNTING	PANEL INSERT (140x140x250)
INPUT POWER	DC 24V
ACCURACY	±5%
SIZE	Makers Standard
COUNTING ABILITY	About : 1500EA per sec (adjustable)
SETTING TIME	about 200sec (adjustable)
LOW BALL SETTING LIMIT ALARM	60~100%
DISPLAY LCD	20 by 4
OPTION	4~20mA remote card



■ How it operates

B.R.M SYSTEM consists of light barrier and processor. Light is composed of emitter and receiver, and transmission line connects the light barrier with the processor. When cleaning ball which is flowing through the recirculation pipe passes the measuring point of BRM, powerful infra-red sent to the emitter is to be blocked and the receiver can detect pass of the ball due to the temporary darkness.

This detection signal is sent to the processor so the quantity of passing balls that are recorded in counter. Also detecting continuously balls passed within measurement period and storing the quantity as the results, if the measured value is less the the alarm set value, B.R.M will sound the alarm.

■ EMITTER (SJ-1S)

- GaAIAs Infrared Emitting Diode
 - Maximum Reverse Voltage : 5.0V
 - Irradiance : 20W/cm²
 - RISE/FAULT TIME : @If : 20mA
 - Junction Capacitance @0V,1MHz(Typ) : 23pF
 - Rise : 1.0s Fall : 1.0s

■ RECEIVER (SJ-1R)

- PHOTO TRANSISTOR
 - LIGHT CURRENT : VCE 5V,
LIGHT CONDITION : 20W/cm² ,
IC MIN : 1.0mA
 - DARK CURRENT : LIGHT CONDITION : 0W/cm²
VCE=10V
 - RISE/FAULT TIME : IC : 1mA
RL = 100Ω
TR/TF : 4.0 sec



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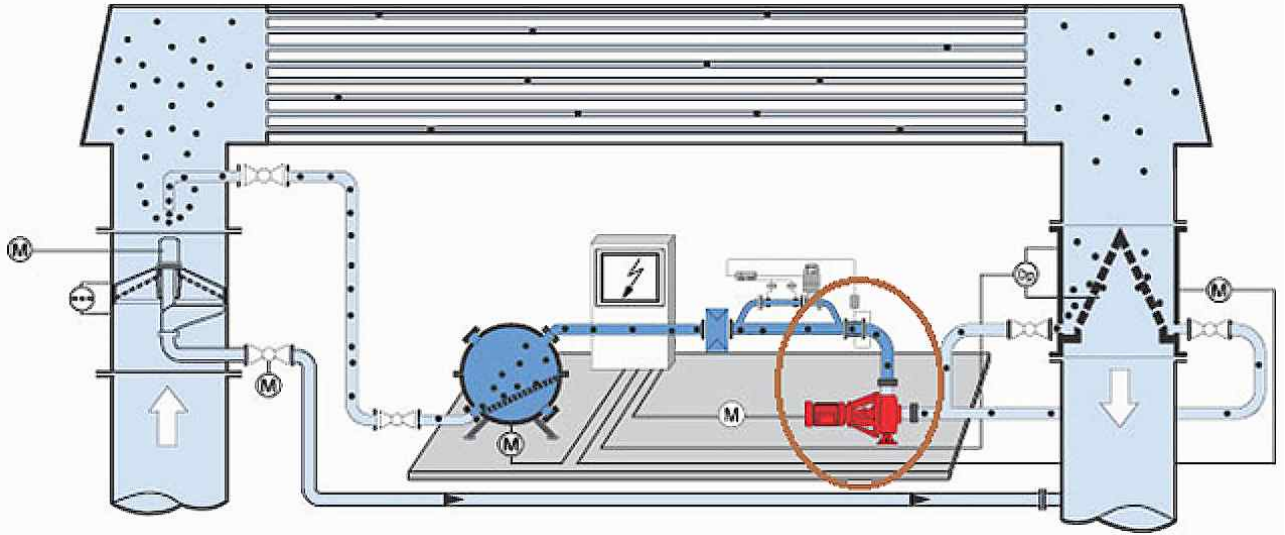
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K-1

SHICO. MODEL : SH-BRM

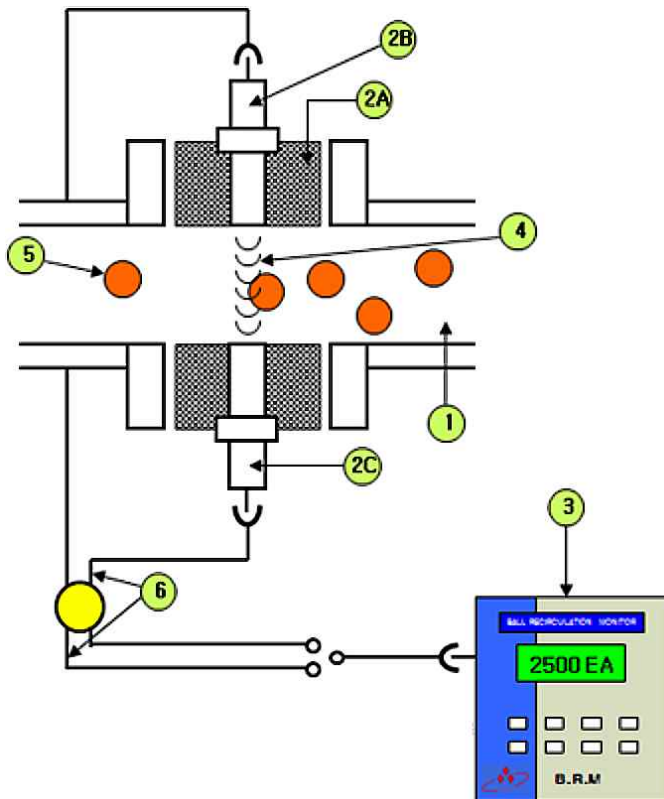
B.R.M [Ball Recirculating Monitoring System]

■ INSTALL STATE



■ SYSTEM CONSTRUCTION

● NAME OF PART



1	Ball Recirculating Pipe	3	Processor BRM (Monitor)
2	Light Barrier	4	Infrared ray
2a	Receptable	5	Cleaning Ball
2b	Emitter	6	Transmission line with Terminal Box
2c	Receiver		

■ BALL OF PASSING THE PIPE



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K-2

B.R.M [Ball Recirculating Monitoring System]

■ Sponge Ball

A complete range of cleaning balls has been developed to cope with various types of tube fouling, different tube materials and condenser pressure drops.

■ Customer benefits

- Preserved integrity of the protective film in tubes
- Durability of tubes
- Ball life maximized
- Cope with various type of fouling
- Adapted to each tube condenser : materials, pressure drops

■ Technical data of sponge ball

Material	Natural Rubber
Longevity	Extended Life Ball formula
Parting Strength	380% ~ 440%
Temperature	-40deg C~120 deg. C in water
Deformation Pressure	22 N/cm ² ~ 45 N/cm ²
Density	S=160Kg/m ³ , F= 200kg/m ³ , N=250Kg/m ³ , B= 300Kg/m ³
Breaking elongation	440%
Elastic to	-40 deg. "C"
Surface Treatment	Vulcanized, Surface Ground
Flammability	Highly flammable, burns with sooting
Stability	Not available towards acids, alkali's, oils fats and solvents
Sinking Velocity	from 2~4 centimeters per sec

■ Ball Identification

	<ul style="list-style-type: none"> ● Type S : Standard balls / P : Extended life balls R : Abrasive balls
	<ul style="list-style-type: none"> ● Specification T : Standard / G : Polishing / Y : Fully Coated Z : Ring Coated with Corundum X : Blended with Corundum
	<ul style="list-style-type: none"> ● Diameter From 16~42mm Increment 1mm Specific diameter available on request
	<ul style="list-style-type: none"> ● Hardness J : Soft / N : Medium-Soft F : Medium-Hard H : Hard
	<ul style="list-style-type: none"> ● Temperature 1 : Standard balls up to 80°C 2 : Heat resistant balls up to 140°C

■ Ball Size

Balls must be slightly oversized (2 mm larger) to apply sufficient pressure inside the tube to ensure correct cleaning.

● Larger diameter

- used for a longer ball-life when the condenser pressure drop is higher than usual. This applies only when the type of fouling allows the use of soft or medium soft cleaning balls. In other cases, the use of extra oversized balls can lead to ball blockage inside condenser tubes, reducing the heat exchange surface and triggering tube corrosion. For the above reason, balls must not swell due to a chemical reaction with water

● Smaller diameter

- when using abrasive coated balls or when condensers are equipped with protective nozzles or when the CTCS design does not prevent the risk of the ball becoming wedged between the strainer bars. In this last case, the use of harder but smaller balls can be convenient.

■ Ball Type

● Standard (S)

- Used continuously in normal conditions for operation in fresh water or sea water. Soft for brass tubes, soft or hard for SS or titanium tubes.

● Extended life(P)

- Used when water fouling is not severe and can be wiped out easily. The spongy structure has a thin smooth layer which wears out slowly to extend lifetime.

● Heavy duty

- Designed to solve the most difficult cases. The balls contain a mixture of polishing agent and rubber, ensuring a continuous and constant efficiency without causing damage to the tube structure

● Abrasive balls(R)

- Used in specific conditions for a short time period. The carborundum content in the balls abrades hard deposits. The use of these type of balls are recommended only when the CTCS does not run continuously and are manufactured only upon request. They are available in three different grades :

- Fully coated (Y)
- Ring coated with Corundum (Z)
- Blended with Corundum (X)

■ Ball Hardness

The choice of hardness is dictated by :

Type of tube fouling / Tube material / The condenser pressure drop / Ball diameter / Use of tube protective nozzles



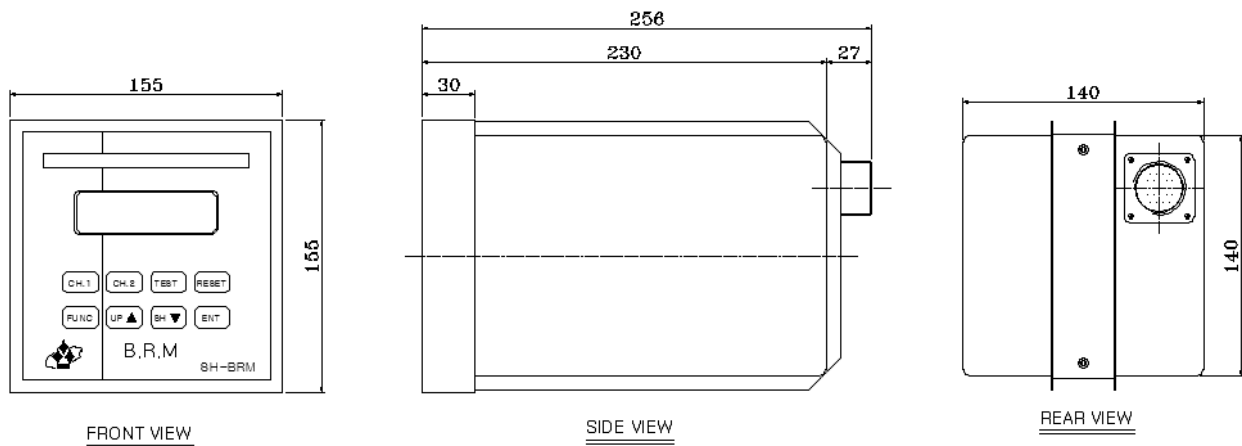
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■ DIMENSION

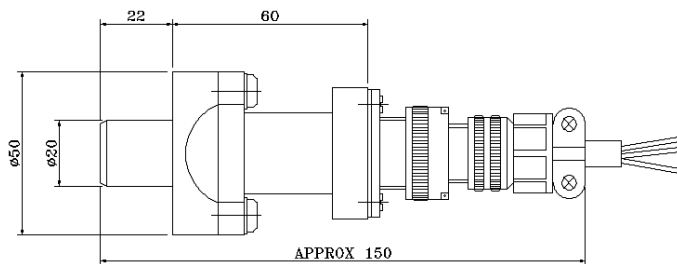


■ SIGNAL CONNECTION

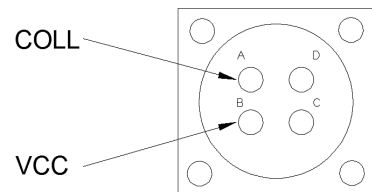
Operating S/W	R (P24), S (OP-IN)	B.R.M OPERATION DIRECT INPUT	Relay Out	E(RY-b), F(RY-c/c), G(RY-a/a)	WARNING OUT
Motor S/W	U (P24), V (MO-IN)		Current Out	H(P24), J(CU-C)	-
Sensor (RX)	K (P : RX-V/3), L (RX - O/2) M (N : RX-N/1)	RECEIVE PART (OPEN COLLECT)	Power in	W(P24-IN), X(N24-IN)	POWER INPUT
Sensor (Tx)	P (P : TX-V/2) , Q (P : TX-C/1)	RECEIVE PART (OUT)	F.G	Z(F.G)	Frame GND

■ Emitter & Receiver

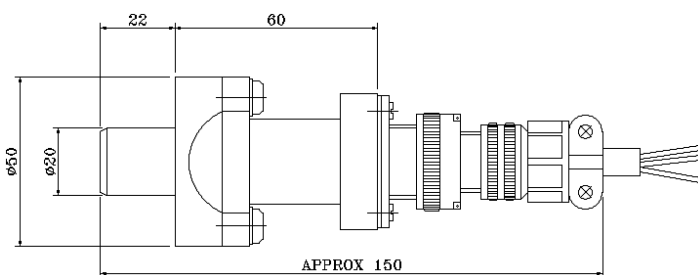
● Emitter (SJ-1S)



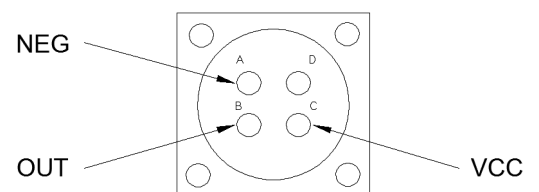
■ SIGNAL CONNECTION



● Receiver (SJ-1R)



■ SIGNAL CONNECTION



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