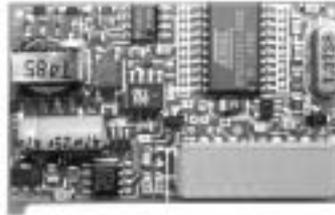


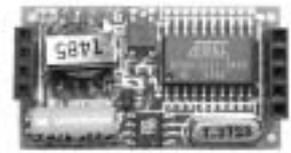
The Data Sheet of retransmission modules CM92-2 CM93-2

1.Features:

- High Precision : 15-bit resolution
- High Linearity : ± 50 PPM of Range
- High Stability : ± 25 PPM / $^{\circ}\text{C}$
- 4-20mA / 0-20mA Programmable
- Digital Calibration : Without variable resistor
- Input / output optically isolated
- Serial Data Input : Minimize pin consumption
- Save space



CM93-2



CM92-2

2. Introduction

The CM92-2, CM93-2 are a series of retransmission modules. These modules perform the same functions but in various mechanical dimensions. The module CM92-2 is used for the following products : BTC-9200, 2220, 3200, 4220, 4230. The CM93-2 is used for the following products : BTC-8120, 8130, 4120, 4130, 7120. The modules accept a serial digital data and convert the data into an analog current output. The modules contain a 15-bit digital to analog converter, a dc to dc voltage converter, photo-coupler for input / output isolation and digital calibration circuit. Each module is calibrated during production. The calibration data are stored permanently in re-programmable flash ROM to prevent a long term drift. The modules can generate 4-20mA as well as 0-20mA signal output according to a programmable input data format. The conversion characteristics are shown in the following diagrams.

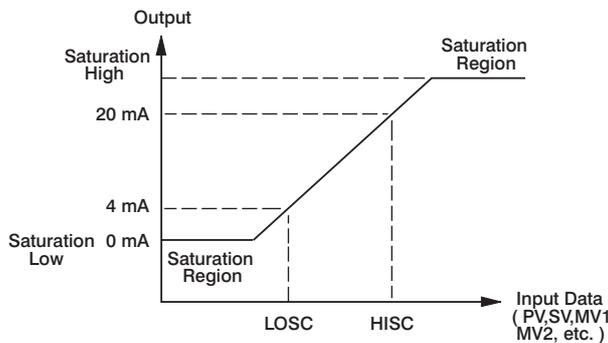


Fig.1 4-20mA Characteristic

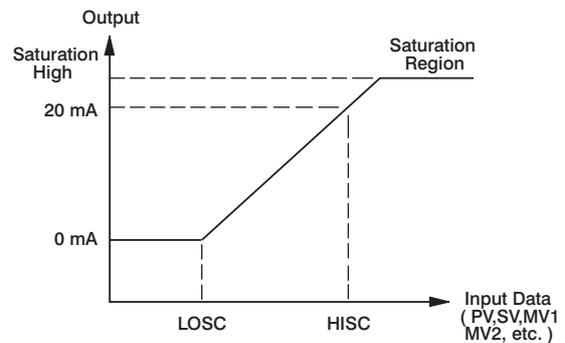


Fig.2 0-20mA Characteristic

Note :

The LOSC is low scale value preset by the user.

The HISC is high scale value preset by the user.

For the application of CM93-2, LOSC is represented by LLIT and HISC is represented by HLIT.

The output signal is determined by the following formulas:

(1) 4 - 20 mA , PV or SV conversion

$$\text{mA} = 4\text{mA} + \frac{\text{PV (or SV)} - \text{LOSC}}{\text{HISC} - \text{LOSC}} \times 16 \text{ mA}$$

(2) 4 - 20 mA , MV1 or MV2 conversion

$$\text{mA} = 4\text{mA} + \frac{\text{MV1 (or MV2)}}{100.0} \times 16 \text{ mA}$$

(3) 0 - 20 mA , PV or SV conversion

$$\text{mA} = \frac{\text{PV (or SV)} - \text{LOSC}}{\text{HISC} - \text{LOSC}} \times 20 \text{ mA}$$

(4) 0 - 20 mA , MV1 or MV2 conversion

$$\text{mA} = \frac{\text{MV1 (or MV2)}}{100.0} \times 20 \text{ mA}$$

3. Setup procedures

(1) Select a correct part number of the retransmission module for the specific product. Fits the module in the product.

(2) Adjust ADDR for CM92-2 and CM93-2 according to the following function table:

ADDR	192	193	194	195	196	197	198	199
Output	4-20mA	4-20mA	4-20mA	4-20mA	0-20mA/0-10V	0-20mA/0-10V	0-20mA/0-10V	0-20mA/0-10V
Retransmit	PV	SV	MV1	MV2	PV	SV	MV1	MV2

(3) Adjust LOSC value for CM92-2 or LLIT value for CM93-2 to meet the desired output zero (corresponding to 4mA, 0mA).

(4) Adjust HISC value for CM92-2 or HLIT value for CM93-2 to meet the desired output span (corresponding to 20mA).

(5) Check if the function and accuracy are acceptable.

4.Re-calibration

The modules are well calibrated during production. Since there is no variable resistor inside, the users can't re-calibrate modules by themselves without the aid of a specific calibration system. If the user intends to change the output value, he can adjust LOSC (or LLIT) value for output zero and adjust HISC (or HLIT) value for the output span. The procedure should be performed several times until the output values meet the requirements because the span adjustment may affect the zero value. The user also can apply the previous formulas to solve the equations and obtain the new values of LOSC and HISC directly to prevent a trial and error process. The above re-calibration method can not apply for the MV1 or MV2 retransmission because zero and span for MV1 and MV2 are fixed (i.e. 0 and 100.0%).

Since the modules have good stability, the accuracy is beyond the industrial requirement, the re-calibration is unnecessary for the most applications.

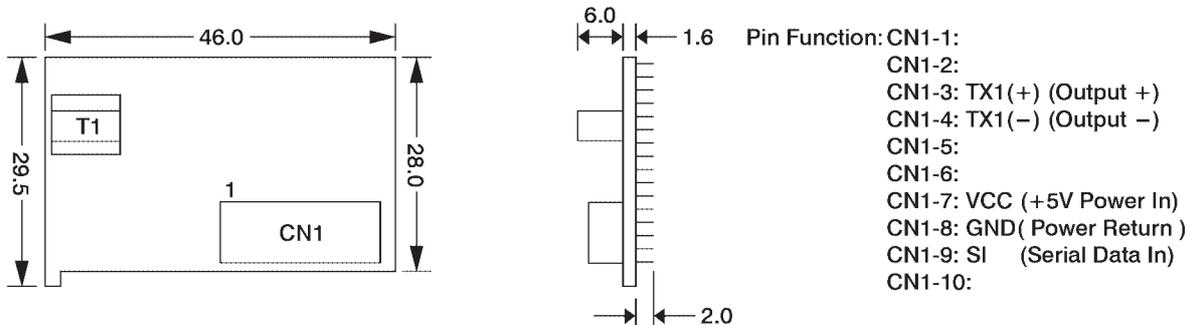
5.Specifications

Resolution : 15 bits
 Accuracy : $\pm 0.05\%$ of span $\pm 0.0025\%$ / °C
 Load Resistance : 0 - 250 ohms (for current output)
 Output Regulation : 0.01% for full load change
 Output Settling Time : 0.1 sec. (stable to 99.9%)
 Isolation Breakdown Voltage : 1000 VAC min.

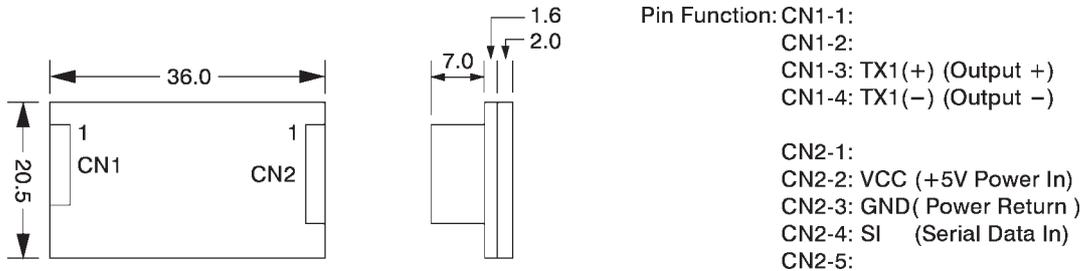
Integral Linearity Error : $\pm 0.005\%$ of span
 Temperature Effect : $\pm 0.0025\%$ of span / °C
 Saturation Low : 0 mA
 Saturation High : 22.2mA min.
 Linear Output Range : 0 - 22.2mA (0 - 20mA or 4 - 20mA)

6. Mechanical Data and Pin Assignment

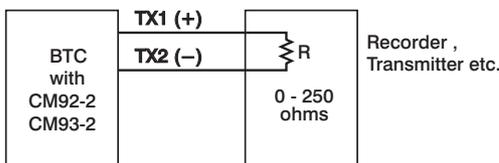
6.1 CM93-2



6.2 CM92-2



7. Connection Diagram



8. Ordering Data

Part No.	CM92-2	CM93-2
Function	0 - 20mA / 4 - 20mA	
Applicable Products	BTC-9200, 2220 3200, 4220, 4230	BTC-8120, 8130 4120, 4130, 7120