44 GDS Helpsheet

Hardware

STD & ADV Controller

Remote Feedback Module (RFM)/RFM02 Setup/Calibration

1. Introduction

The RFM firmware and hardware gives the GDS controller the capability of accepting input from an external transducer. The system also allows the controller to control the movement of it's piston using the signal from the external transducer as an input. The external transducer reading can also be made available over the computer interface. The RFM *control* capability must only be used if the external transducer is directly affected by the pressure in the controller to which it is connected. It is also a requirement that the parameter being measured must be affected in the same way as the pressure in the controller. For example, a pressure controller connected to the lower chamber of a triaxial cell which also has an RFM connected to a load cell in the same triaxial cell can be used under RFM control. This is because an increase in the pressure in the lower chamber will cause an increase in load on the test specimen, so the sense of change is identical and the size of change is related to the pressure in the lower chamber. However, if you have a pressure controller connected to the cell pressure connection in a triaxial cell and an RFM connected to a displacement transducer which is measuring axial displacement then in this case you must not use the RFM in a *control* condition.

GDS supplies a signal conditioning system to attach to transducers that will interface the transducers correctly to the RFM input of the controller. We call this device either a personality module or the RFM02.
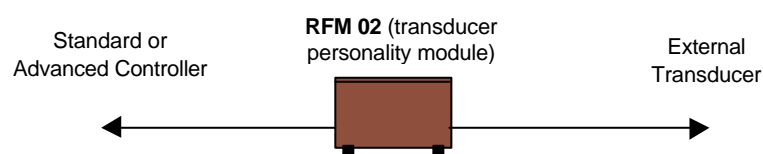
There are two stages to the calibration of a transducer with the RFM system. The first stage is to ensure that the main controller is correctly calibrated. This requires an accurate volt meter setup to measure 10 Volts on Conn 1 pins 1 and 2. These pins are marked V+ and V- on the RFM02 internal PCB (see diagram below).
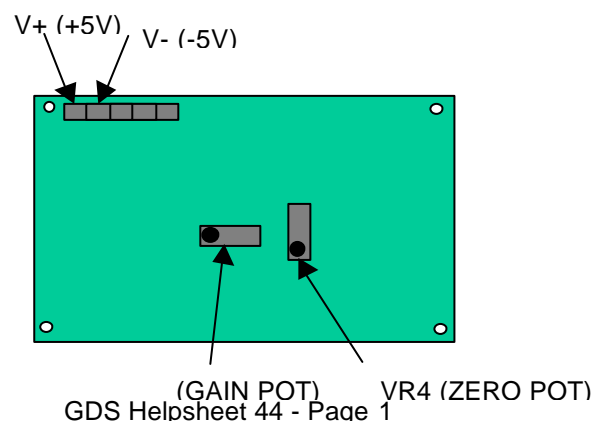
First check that the excitation voltage is exactly 10 volts. If it is not 10 volts then the RFM01 card in the main controller (advanced controller) or the 10 Volts potentiometer on the main board inside the controller (standard controller) needs to be adjusted to ensure that the output is exactly 10 volts.

The RFM parameters on the controller should be set to range = 1 decimal places = zero . The maximum and minimum RFM parameters should both be set to 4050.

The next stage is to set up the calibration for the RFM02 plus its associated transducer. Remove the top of the RFM02 using the four screws. The PCB used inside the RFM02 is illustrated on the previous page. The procedure for calibrating the RFM02 requires that you can apply a known zero to the transducer and also a known value to the transducer. First of all set up the correct range, decimal points, maximum and minimum parameters on the controller for the RFM and its associated transducer. You should check that any RFM soft zero offset is removed using the keystrokes "RESET" "O" "." "7" (Standard Controller) or "RESET" "O" "4" "7" (Advanced Controller). With a known zero value on the transducer you should adjust the zero offset potentiometer in the RFM 02 until the reading for the RFM on the controller indicates zero. Then with a known value on the transducer which is between half full range and full range, you can adjust the gain potentiometer on the RFM02 until the controller reads the correct known value. Please note that this procedure will be iterative when the transducer's output at zero value does not also give a zero volts output. After setting the gain value return to the zero to check if the zero is still zero if not re-zero it, then return to the known transducer value and reset the gain. This procedure can then be repeated until the zero is consistent and the gain is consistent. If you do not have a reference value for the transducer then you will need to set the RFM02 up electrically using the transducer manufacturer's calibration certificate.

The methods of applying known values to transducers could be any of the following:

- For a pressure transducer a GDS controller that has been checked against a standard source of pressure could be used to generate the reference pressure.

- For a displacement transducer it is normally quite straightforward to check the full range reading against a standard calliper or micrometer gauge.

- For a load cell this can sometimes be more difficult. If the load cell is within the hydraulic Bishop & Wesley triaxial cell then from a knowledge of the pressure in the lower chamber a computation of the axial load can be made and used as the calibration value for the load cell.

If you feel that you do not have sufficient equipment to re-calibrate a transducer and RFM02 together then you can return them to GDS who will re-calibrate them for a small fee. Please check with GDS for the fees involved.