

Application

A C320 with K306 firmware is mounted on a floor scale that is used for a filling application that uses multiple taring which is used to fill 20 kg liquid detergent bottles from a 500 kg tank. The operator can fill the bottles one by one using this multiple taring. The D841 remote display shows the net liquid detergent weight in the tank (using the multiple tare feature). Set points control the output which controls the valve of the tank.

- The scale is configured as a 1000 kg x 0.1 kg.
- The weight of the empty tank is 35 kg.
- The target weight of the detergent bottle is 20 kg.



There are three set points used in this application:

Set Point 1: Remote display control – It drives OUT 1 if target weight is less than 20 kg. The C320 backlight will be Red when the Net tank weight is less than 20 kg.

Set Point 2: W.OUT valve control, when active the backlight is Amber to indicate that filling is in progress.

Set Point 3: When active, the backlight is Teal to indicate that next bottle is ready for filling.

- Set Point 1 and Set Point 2 are connected to the Output 1 and Output 2 respectively.
- Input 1 is connected to a limit switch which is used to detect the presence of the bottle.
- RESET is also set with Input 1.
- Input 1 is wired with the Output 1 which is fixed with the remote display.

Configuration

To enter the full setup menu, hold down the **SELECT** key for a few seconds.

```

┌─ FULL SETUP
├── LANG      : EN
├── GEN.OPT
├── SCALE
├── SERIAL
├── SETP
├── APP
│   ├── P.COUNT : OFF
│   ├── CHECK.W
│   ├── A.TARE
│   ├── F1 KEY
│   │   └── TYPE      : TARGET
│   ├── F2 KEY
│   │   └── TYPE      : FUNC.EN
│   ├── F3 KEY
│   ├── IN 1
│   │   └── TYPE      : NONE
│   ├── IN 2
│   └── TEST
└── End
    
```

F1 KEY sets as **TARGET** key which allows the operator to view and edit the set point targets with a long press.

F2 KEY configured as function enable which allows the operator to temporarily terminate all automatic system. So, by F2 key operator can switch on and off the setpoint functions.

Input 1 is used as a reset input, so it should not be configured here, use NONE (which is the default type)

```

┌─ SERIAL
├── HEADER   :
├── FOOTER   :
├── SER 1
├── SER 2
├── SER 3
│   ├── BAUD      : 9600
│   ├── DATA     : 8
│   ├── PARITY    : P NONE
│   ├── STOP      : 1
│   ├── SER.NET
│   │   ├── ADDR  : 1
│   │   └── TYPE   : RINCMD
│   ├── SER.AUT
│   │   ├── FORMAT : FMT.C
│   │   ├── AUT.SPD : 10Hz
│   │   └── SOURCE  : P.NET.PT
│   └── PRINT
    
```

BAUD sets the baud rate for the port and 9600 is the default value. **DATA** sets the number of data bits for the port.

PARITY sets the parity for the port and **STOP** is the number of stop bits for the port. These values can be given as required.

SER.NET configures the serial networking support. **ADDR** is the address of instrument, and it can be set as required. Sets the network protocol type as **RINCMD**.

SER.AUT automatic serial outputs are normally used for remote displays. Format C is selected here for a Rinstrum remote.

Rinstrum remote displays can operate with a rate of transmission (**AUT.SPD**) of 10 Hz.

The data **SOURCE** can be set to use the present **NET.PT** value is used for that.

NOTE: To use the multiple tare feature for this example, set the PT clear setting as off (PT.CLR: OFF).
 (To go to settings, use FULL SETP -> SCALE -> OPTION -> PT.CLR)

SET POINTS:

SETP	
SETP1	
TYPE	: UNDER
LOGIC	: HIGH
TIMING	: LEVEL
TARGET	: 20.0 kg
FLIGHT	: 0.0 kg
HYS	: 0.0 kg
ALARM	: NONE
B.LIGHT	: RED
SOURCE	: NET.PT
RESET	: NONE
NAME	: Under
SETP2	
TYPE	: W.OUT
LOGIC	: HIGH
TIMING	: LEVEL
TARGET	: - 20.0 kg
FLIGHT	: 0.0 kg
HYS	: 0.0 kg
ALARM	: NONE
B.LIGHT	: AMBER
SOURCE	: NET
RESET	: IN 1
NAME	: Fill
SETP3	
TYPE	: ON
LOGIC	: HIGH
TIMING	: LEVEL
ALARM	: NONE
B.LIGHT	: TEAL
RESET	: IN 1
NAME	: Ready

SET POINT 1: UNDER

This is active until NET.PT is 20 kg after entering preset tare.

If it is less than 20 kg, the backlight is red, and it will send the output to the remote display and then red traffic light is on.

SET POINT 2: W.OUT

This is active unit the target weight is reached. The weight out will continue until the -20 kg (net) target is reached.

When active the backlight is amber.

Input 1, that is connected to the limit switch (to detect the presence of the bottle) is used as a RESET to stop the filling process when the bottle is not there.

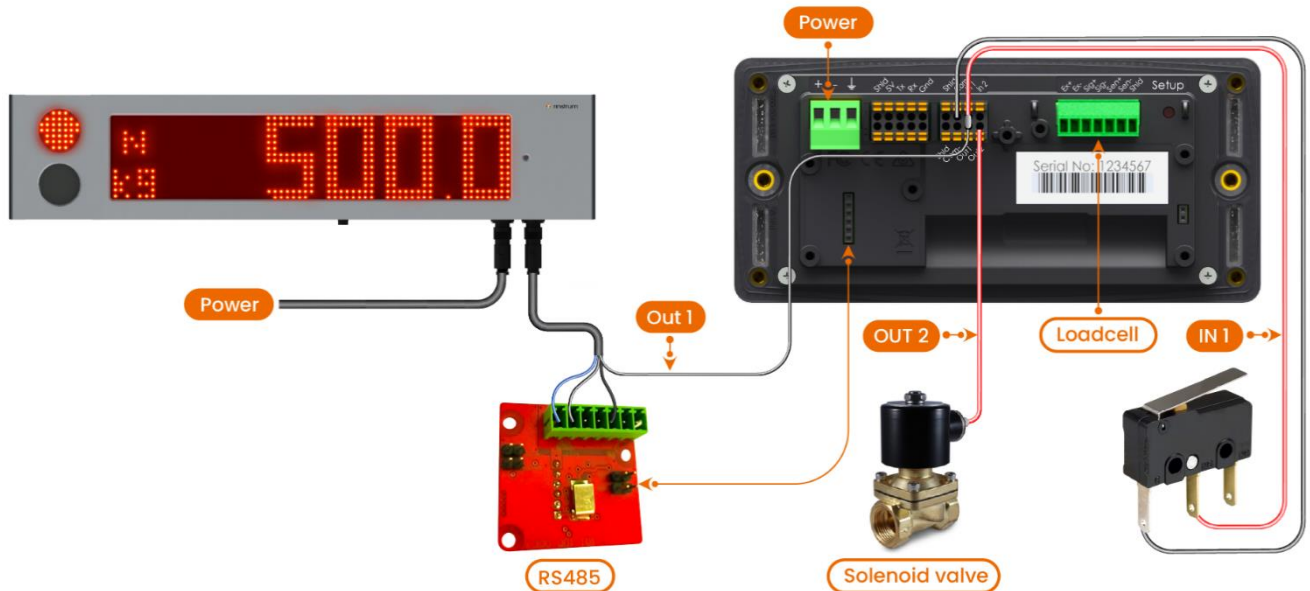
SET POINT 3: ON

This set point is active when the filling is complete.

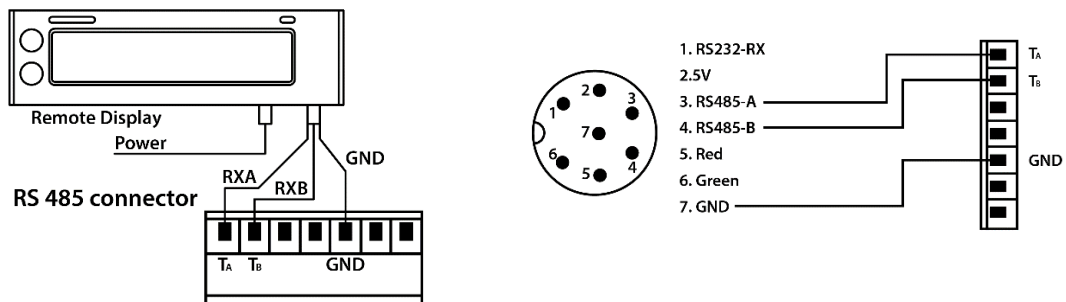
The backlight is TEAL to indicate that the next bottle is ready for the filling.

Input 1, that is connected to the limit switch (to detect the presence of the bottle) is used as a RESET to ensure no filling process when the bottle is not there.

Inputs / Outputs



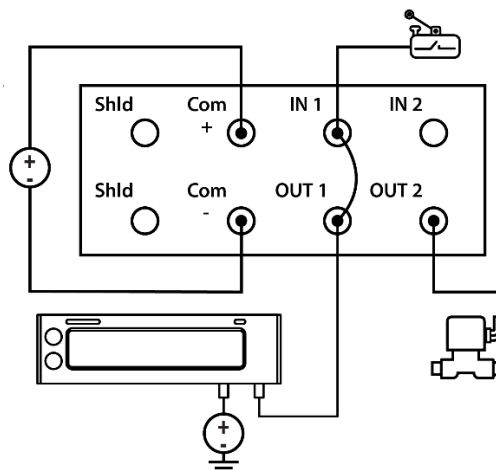
- RS485 is connected to the remote display for serial communication. TA, TB and GND of the RS485 are connected to RS485-A, RS485-B and GND on the remote display respectively.
- OUT 1 is connected to the red traffic light of the remote display and wired to IN 1.



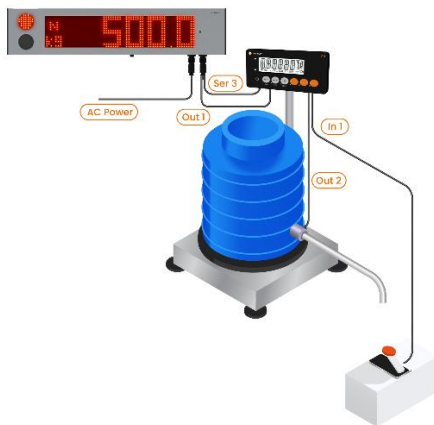
- IN 1 is connected to the limit switch which is used to detect the presence of the bottle.
- OUT 2 is connected to the solenoid valve and it is controlled by the setpoint 2.

Operation

In this example a C320 indicator is used to fill the liquid detergent bottles using multiple taring. Steps are given below.



STEP 1: Place the full detergent tank on the scale.



Here a filled liquid detergent tank is 500 kg.



During this time remote display shows 500.0 kg and red traffic light will on. (Limit switch is open, due to the Out 1 and In 1 connection red traffic light will on.)

STEP 2: Enter Preset Tare of tank.

Long press of the **TARE** key to enter the preset tare. PT = 35 kg

Net weight of the tank will be 465 kg.

(The Operator can view the gross weight, preset tare value and net. PT weight by pressing SELECT key.)



STEP 3: Press tare key to tare the setup.

When the indicator value is 0 kg remote display shows 465 kg (NET.PT).



STEP 4: Start filling bottle.

Place the empty bottle on the plate to trigger the limit switch. Once the bottle is in place, the switch will close triggering Input 1 and the filling will start. Setpoint 2 is active.

When start filling, remote display shows 465 kg at the start and weight is decreasing during filling.



STEP 5: Filling in progress.

Fill the bottle via the OUT 2 valve. When the filling is in progress, the display colour will be amber and set point 2 is active.

When the weight goes down from 0.0 kg to -20kg during filling, the remote display will show the weight of the remain detergent in the tank (NET.PT).

Eg: When the indicator value is -15.5 kg remote display shows NET.PT as 449.5 kg.

$$\text{NET.PT} = (465 - 15.5) \text{ kg}$$



STEP 6: Fill Complete

Once the filling is finished operator needs to tare and then next bottle can be filled. Setpoint 3 is active.

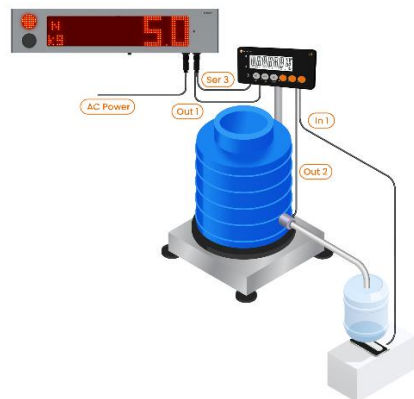
The backlight colour will be TEAL to indicate it is ok to fill the next bottle when weight reached -20 kg. Remote display shows 445 kg.



Tank Net weight goes below 20kg.

When the weight (NET.PT) of the liquid detergent in the tank is less than 20 kg, operator is unable to fill a bottle. Setpoint 1 is active. The C320 display also will be red colour.

According to this example, for the last bottle when indicator is showing 0.0 kg display will be red colour. Because at this time NET.PT will be 5 kg. So remote display shows 5 kg and red traffic light will on.



For more information refer to the C300-600 Reference Manual.