(1828, 1918, 1940, 1958, 1967, 2017, 2162, 2176, 2286, 2461, 2486, 2536, 2609, 2616, 2619, 2650, 2739, 2780, 2805, 2806)

BIS
Department for Business Innovation & Skills

III(5)a

SUPPLEMENT TO CERTIFICATE

Series S031

Certification No.	Supplement No	Certification No.	Supplement No.
1828/40*	59	2486/54*	71
1918/74*	90	2536	77
1940	91	2609	2
1958/53*	75	2616	17
1967/66*	82	2619/43*	60
2017	93	2650/35*	72
2162/92*	109	2739	2
2176/78*	97	2780	24
2286/58*	74	2805	3
2461/26*	40	2806	3

(*) Refers to the dispenser only, the self service or other devices described in these certificates do not form part of this approval.

Submitted by: **Kraus Global Inc.**
25 Paquin Road
Winnipeg,
Manitoba
Canada

Authorisation is hereby given by the Secretary of State for Business, Innovation & Skills for the above Certificates of approval relating to a pattern of a liquid flowmeter to be modified as described below.

As described in the above Certificates but modified to have an automatic temperature compensation device (ATC), as detailed in the descriptive annex, and having the following characteristics:-:-

DISPENSER — Dispensers described in the above certification numbers:

AUTOMATIC TEMPERATURE COMPENSATION DEVICE (ATC): — ATC for petrol and diesel: SZN 100 V4.0 or V4.34
Display device: 212SW02 V2.2 or 212SW06 V3.1.

Signatory: *P R Dixon*
for Chief Executive
National Weights & Measures Laboratory
(part of the National Measurement Office)
Department for Business, Innovation & Skills
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Reference No: T1117/0040

Date: 27 July 2010

CONTENTS

ILLUSTRATIONS

Descriptive Annex

1 INTRODUCTION

The Kraus Global type SZN 100 ATC conversion device, for use with up to four meters, corrects the volume of fuel, measured at base conditions, to an indicated volume at reference conditions (15°C). The ATC function is added by connecting the ATC unit between the output from the dispenser pulser and the input to dispenser calculator. The ATC provides a pulse output stream relating to the volume which has been corrected for temperature, by monitoring the temperature of the fluid passing through the meter. The pulse output is no longer a fixed number of pulses per rotation of the meter output shaft, but is adjusted so that the volume of fuel is as if it were dispensed at 15°C. The temperature measurement is provided by a temperature probe, fitted into the supply pipework, located as close as possible to the meter.

The volume at metering conditions, the product temperature and the selected reference density can be displayed on an inspection display that is, or can be, connected to the ATC unit.

2 CONSTRUCTION

2.1 Software

2.1.1 The software version numbers, for use with petrol and diesel, are printed onto labels attached to the Eprom of the:

- ATC for petrol and diesel: SZN 100 board V4.0 or V4.34
- Display (Inspection) device: 212SW02 V2.2 or 212SW06 V3.1

The software is not divided into two parts, i.e. Weights and Measures and non-Weights and Measures.

2.2 Temperature Probes

2.2.1 The probe is a Kraus Global Inc, model type 44030 or type W199-4 ATEX, which is positioned either directly, or via a Thermal Test Well, into the inlet pipework and located as close as possible to the meter. A second Thermal Test Well is located adjacent to the probe and is for use, with another temperature sensor, in checking that the probe is operating correctly. The second Test Well has to be covered with a plug to prevent dirt entering the Test Well. The W199-4 temperature probe is connected to the IS barrier box.

3 OPERATION

3.1 The ATC counts the number of pulses received from the measurement transducers, impulse encoders (level A as per API chapter 5 section 5, double channel, 90° phase shift), measures the product temperature and uses these measured values and a stored reference density value (kg/m3) to calculate the volume at reference conditions. The ATC sends out a number of impulses, that is representative of the converted volume, to the calculating and indicating device.

3.2 The ATC performs conversion calculations according to:

- ASTM table D1250-04, 54B (refined petroleum products);

The conversion is based on the measured volume at metering conditions, the measured product temperature and a stored product reference density value (kg/m³). The product reference density is the density at a product temperature of 15°C.

3.3 The program code and conversion tables are stored during normal use in the unchangeable EPROM. They are protected against errors with a 16 bit checksum. The appropriate portions of the EPROM are summed directly after the start of every transaction on either the A or B side of the dispenser. In addition to protection against changes of the EPROM the system checks against loss of processor clock and program continuity (watchdog timer). Any of these errors will cause the ATC unit to send "bad pulse" streams to the connected dispenser's calculating and indicating device, to trigger an error and abort any active transactions. This has the effect of disallowing any new or current transactions on either side of the dispenser. The ATC display will also show an error at this time.
This condition will continue until power of the ATC unit is cycled.

3.4 The volume at metering conditions, the product temperature and the selected product reference density can be viewed on the inspection display that is, or can be, connected to the ATC unit.

3.5 The temperature sensor cable is connected into the ATC enclosure box via the IS barrier.

3.6 The configuration of the calculating and indicating device, and the position of the dipswitches, is given in the following Table.

Setting	Dip switch	Odd switches	Even switches	Density
Product code for product 1(J3)	1 2	Off	Off	745 (95 & 98 Octane)
Product code for product 2 (J4)	3 4	On	Off	833 (Diesel & Gasoil Extra)
Product code for product 3 (J11)	5 6	On	On	850 (Gasoil)
Connection J12 – P12 is fixed		Off	On	800 (Lamp oil)
Polarity nozzle contact(s)	7	Off: Nozzle contacts connected without tension On: Nozzle contacts to be placed parallel on J3 for side A and for side B of a dual dispenser (dip switch 1 and 2, choose product side A, dip switch 3 and 4, choose product side B, dip switch 5 and 6 not used)		
Selects whether ATC is enabled or disabled	8	Off: ATC kit is **not** active, inlet and outlet pulses will be the same; (to be used for calibration of the dispenser). On: ATC is active, pulses will be scaled depending upon temperature		

Table 1

3.7 Selectable presentations on the display

- Volume at metering conditions.
- Measured product temperature.
- Selected reference density.
- Error codes.

3.8 ATC Display Board

3.8.1 Functions Figure 2

The three switches on the board determine what information is displayed.

- Switch #1 Selects between side A and B
- Switch #2 Selects between instantaneous temperature and uncompensated pulses.
- Switch #3 Shows density

3.8.2 Error Messages

Error message will alternate at 2 second intervals with the information selected by the switches.

Prob = Probe Error
Puls = Pulse Error

Priority of error is as shown above, when both errors are detected, i.e. a Probe and a Pulse error, only "Prob" will be indicated.

When nozzle is activated, the display could show following code:

OFF= ATC Compensation is disabled

3.9 Software version check

The software version can be checked by setting the switches on the display board as shown in Figure 3 and then by taking out the nozzle. The software version will be shown for 2 seconds on the ATC display, after this the temperature will be shown.

3.10 Securing

3.10.1 The ATC enclosure is secured with a seal Figure 4, or the dip switches and two trimmers are enclosed by a cover which sealed; as shown in Figure 5. The enclosures / covers may vary so the figures are examples for guidance purposes

3.10.2 Securing of the I.S. barrier is shown in Figure 6.

3.10.3 The temperature probe is secured, to prevent its removal (Figure 7).

3.10.4 The I.S. barrier is secured as shown in Figure 8.

4 Authorised alternatives

4.1 Having the ATC connected to an LPG meter, the ATC performs conversion calculations according to the DIN51757, Method X, or the API Manual of Petroleum Measurements Standards, Chapter 11.2 part 4 (2007) table 54E (Temperature Correction for the Volume of LPG).

4.1.1 ATC software version: for LPG: 216SW06 V5.0.

4.2 Having the ATC connected to one, or two, Kraus adapter boards (Figure 9), which is fitted into the ATC enclosure. The adapter converts the "shapes" of incoming pulses into square wave, and then re-converts before sending to the dispenser calculator. The ATC adapter can be set to adapt to a variety of impulse shapes.

5 Conditions

5.1 For dispensers providing temperature compensation, the primary indicator (dispenser display) shall clearly indicate that the volume dispensed is corrected to 15 °C.

5.2 When this ATC is part of a fuel dispenser or LPG measuring device, the minimum measured quantity of that fuel dispenser, or LPG measuring device, shall be clearly indicated as being 5 litres.

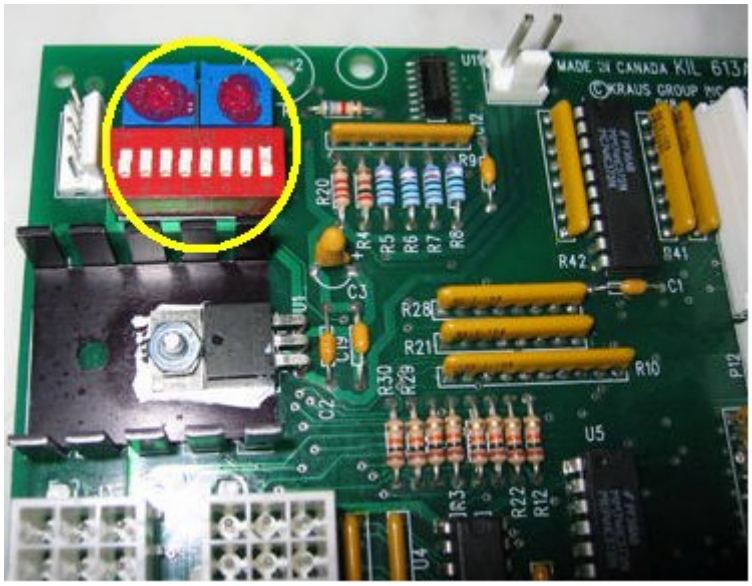
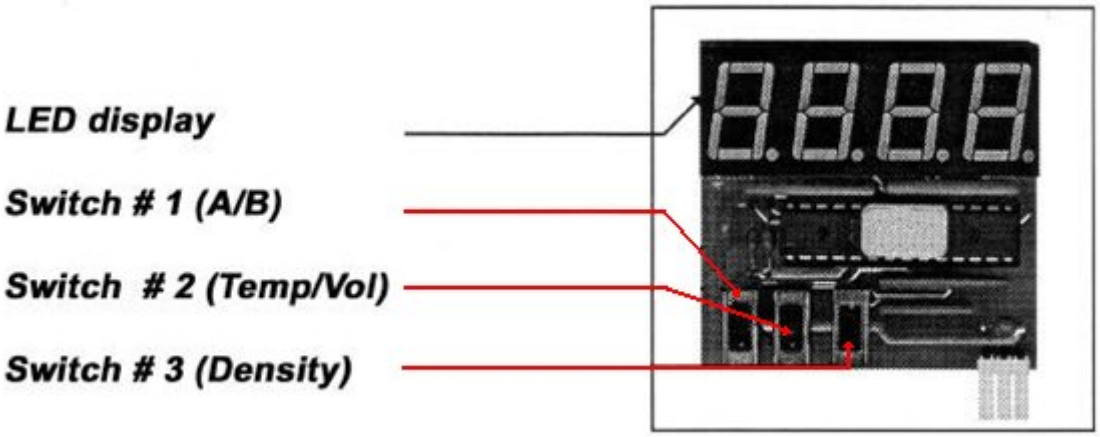


Figure 1 Position of the dipswitches



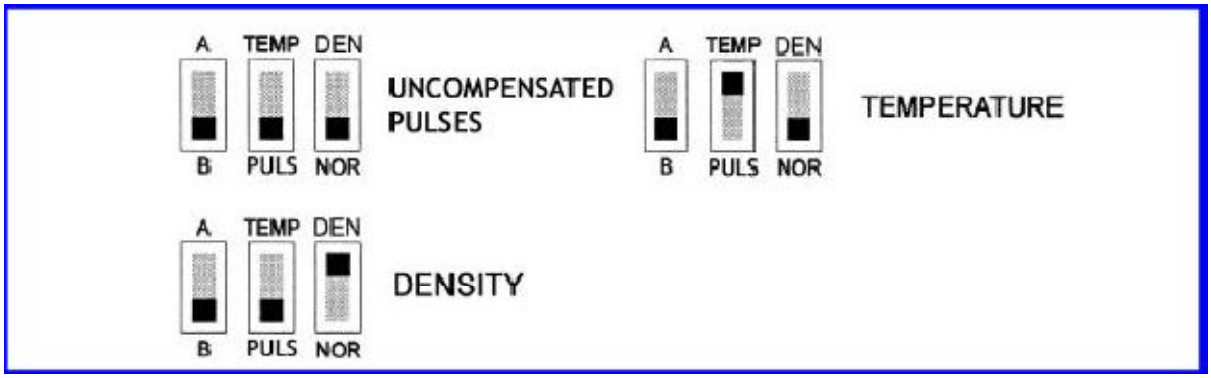


Figure 2 ATC Display Board, Functions & Settings

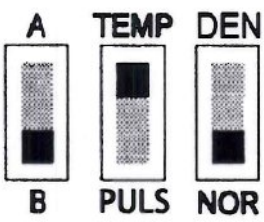


Figure 3 Switch setting to display software version

Figure 4 Securing of ATC Enclosure

Figure 5 Cover enclosing the dip switches and the two trimmers

Figure 6 Securing of I.S. barriers

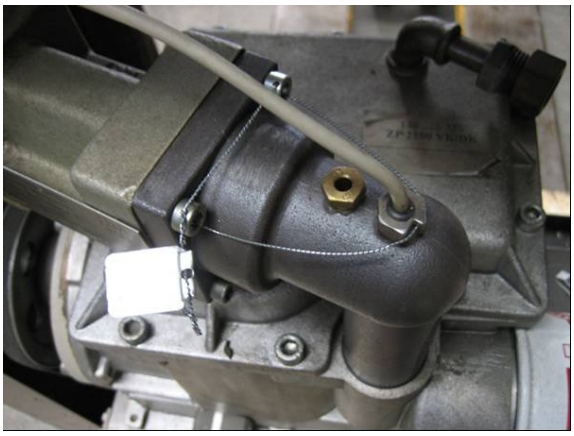


Figure 7 Example of securing temperature probe

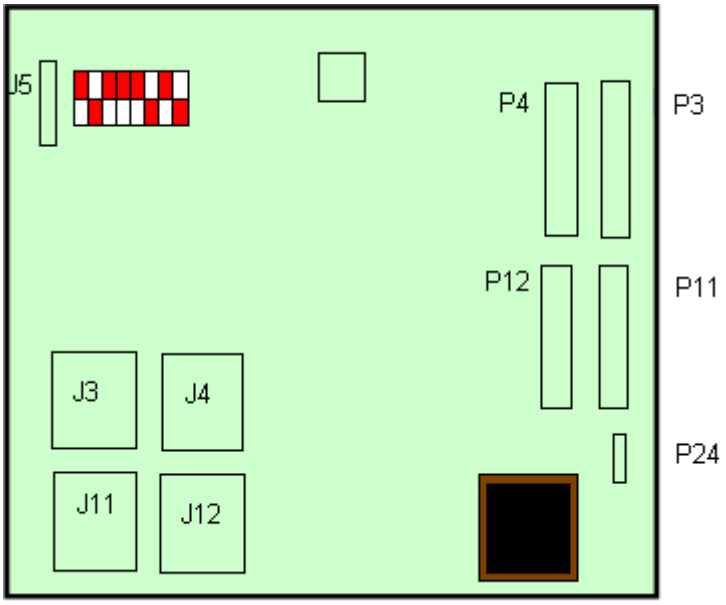
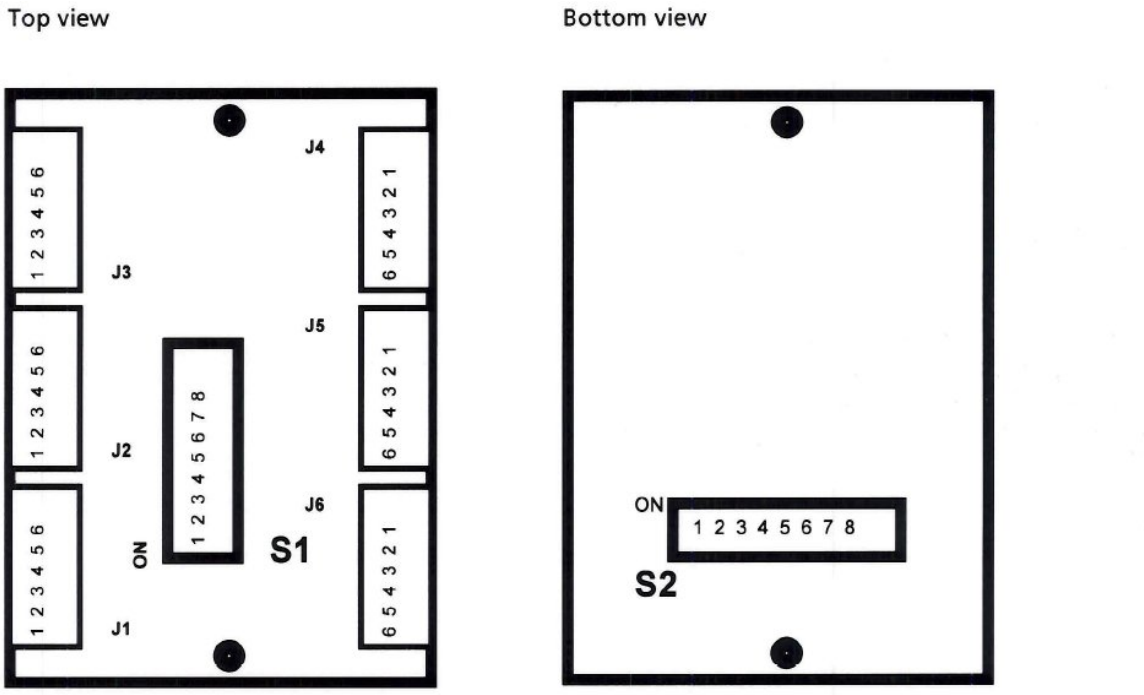


Figure 8 ATC board schematic



Switch S1: Settings to be clarified by the manufacturer or user.

Switch S2: Settings are subject to the specifications of the applied impulse encoder, and have to be clarified by the manufacturer or user.

Figure 9 ATC adapter board