

Universal Hand Held Tachometer MOVIPORT C118 Series Manual



Hand Held Tachometer C118 + Cable SAK-2m + Sensor A1S30P95

Universal Hand Held Tachometer MOVIPOINT C118 Series Manual

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applicable since Serial No. 012535

Scope of the MOVIPORT C118 Series – Overview

| Ordering No. | Equipment comprising |
|-----------------|---|
| C118BS | Standard Equipment with battery-powered Instrument C118, Optosensor A1S30P95, plug-in connector cable SAK-2m, marking aids, carrying case |
| C118.1BS | Instrument with RS232 Data Interface and adapter cable L3D01, other equipment as under C118BS |
| C118.2BS | Instrument with Manual Preset of Input Sensitivity, other equipment as under C118BS |
| C118.3BS | Instrument with RS232 Data Interface and adapter cable L3D01, other equipment as under C118.2BS |
| C118.2BP | Instrument with high efficiency sensor A1S36P95 with 5m firmly attached cable, in place of A1S30P95+SAK-2m Equipment, other equipment as under C118.2BS |
| C118.3BP | Instrument with RS232 Data Interface and adapter cable L3D01, other equipment as under C118.2BP |

Scope of Sensors and Cables to C118 see page 6

Extra Accessories

| Application | Part No. |
|--|--|
| Set of (not-rechargeable) batteries | MN1500x4 |
| Power Supply Unit (to feed the C118 immediately from mains (100 V...240 V AC) | U1H008 |
| Set of rechargeable cells in place of batteries | IECR6 |
| Charger to IECR6 from 230 V AC | U1H009 |
| Plug-in cable to output, 3 m long, BNC connectors at both ends (one cable per output required) | U1H014 |
| High reflection marking tape | bag of 10 pieces roll of 4,5 m length |
| | U1A006/10 U1A006/1 |
| Magneto-based adjustable sensor clamp | U9A001 |
| RS232 adapter cable between C118 and PC, 1,8 m length | L3D01 |

Specifications

Measuring Function Principle

Pulse distance measurement with automatically extended number of periods, as determined by a programmable* minimum measuring time allowance.

Low end of operating range programmable*, high end = 100 kHz.

Accuracy $\pm 0.05\% \pm 1$ in last active digit.

Special Function (SF) provides continuous totalizing of input pulses.

Modes of Operation

Push-button selection between FIX = straight tachometer function and

VAR = use of incorporated programmable* computing facilities.

Computing Facility to convert Measurements into other Variables

6 digits programmable* conversion factor, multiplying or dividing, representing a roll circumference, or gear ratio, or transmitter factor, for instance.

Display

6 digits reading speed by selectable units .../sec, .../min, .../h, or totals (SF).

Decimals by automatic shifting (FIX mode) or firm on programmable position (VAR mode).

Memory

Maximum, Minimum, Average, over a controllable period of time. Call to display by push-button.

Signal Input

To pulses or AC voltage from 50 mV_{eff} up to 60 volts. Selection of automatic response characteristics. Programmable* frequency pre-divider 001 ...255.

Sensor supply 5 volts / max 60 ma.

Analog Output

0 ... 4 volts, short circuit protected. Source impedance 100 ohms. Linearly related to display. Low and high end of conversion range programmable* for spread reading. Resolution 12 bit.

Pulse Output

Square wave shaped, with its sequence repeating the input, reduced by programmed pre-divider. 5 volts TTL-level.

Power Supply

Inserted batteries (4xMN1500), or rechargeable cells (IECR6). Alternatively by supply unit (U1H008) from mains 100 ... 250 volts AC, plug-in connection.

Operating Conditions

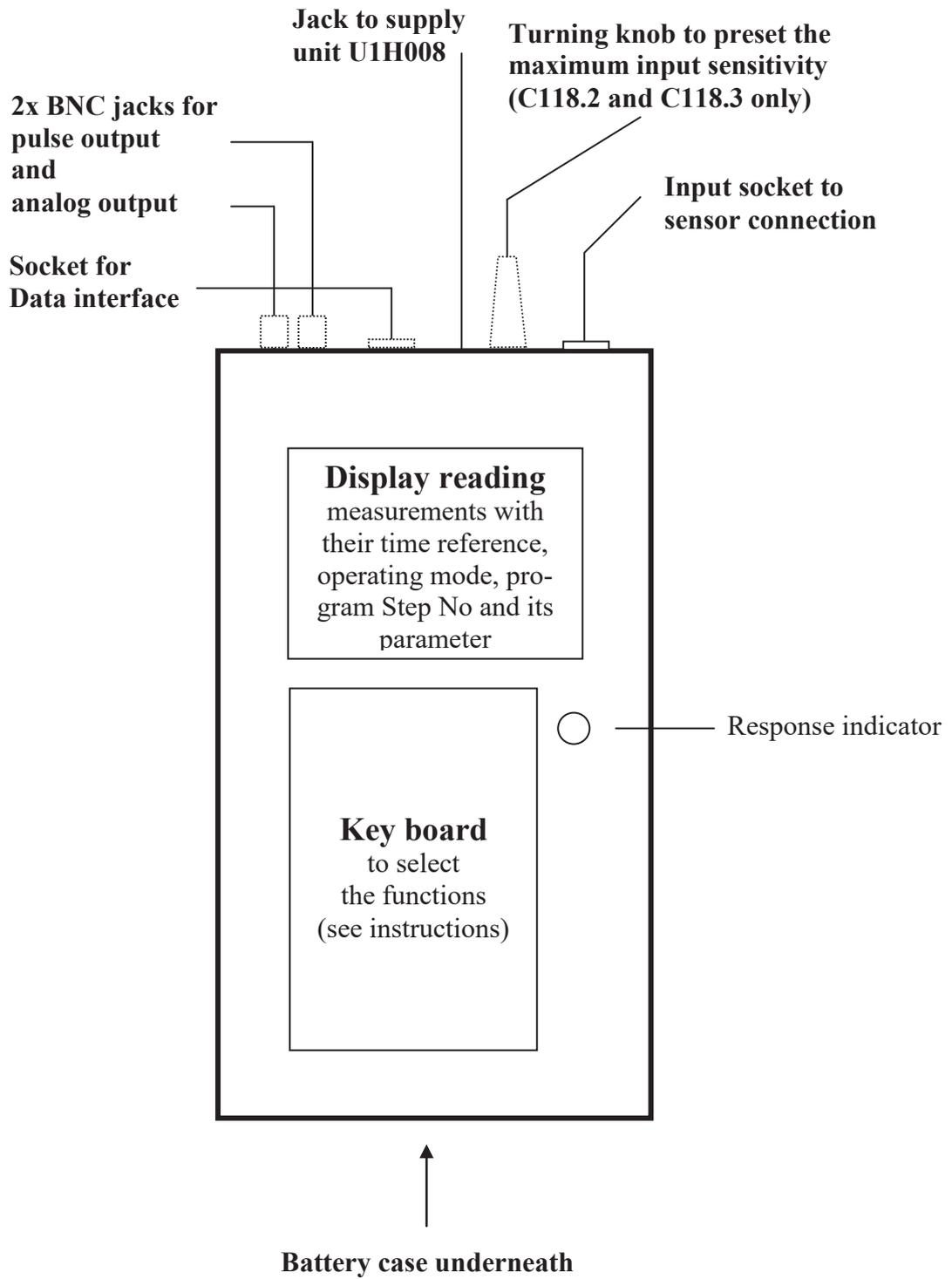
Ambient Temperature -10 ... + 55 °C (14 ... 130 °F). Protection grade IP 54.

Dimensions 195 x 100 x 40 mm. Weight (with batteries) approx. 480 grams.

*** Programming effective only in VAR mode. Parameter List on page 14.**

For additional specifications of special versions see corresponding chapters.

Operational Elements



Short Form Instructions to Operation

Further explanation on page



| | | |
|-----------------------------------|----|---|
| FIX Operation Mode | 13 | Immediate direct tachometer function. Range 30 / min up to 100,000 / sec, valid for 1 mark per revolution. Display with automatic decimal point: Last digit = 0.x ⇒ 0.0 ⇒ 0x Details on page 13. |
| no programming at all required | | |
| VAR Operation Mode | 14 | actuate key FIX/VAR to switch to VAR. Programming procedure and function instructions start on page 14. |
| programming facilities get valid | | |
| Signal Input | 9 | plug in sensor immediately into socket, or use connection cable. |
| Response Characteristics | 11 | For normal operation use predetermined automatic mode. Manual knob preset at C118.2 and C118.3. To eliminate the automatic mode, keep AVG key depressed, and actuate FIX key for approx. 1 sec. Display indicates AUTO OFF. Use same procedure to return to automatic response. |
| Time reference of Readings | 13 | select by /h /min /sec key for speed, or select totalizing by SF (its period being effective from first actuation of BEGIN key to subsequent one = END). |
| Analog Output | 17 | effective in both modes FIX and VAR, range as set by program. |
| MAX / MIN / Average | 12 | memorized between BEGIN and END (key actuation). Call to display by keys MAX, MIN, or AVG. |
| ON / OFF | 10 | by ON/OFF key. Programmable to automatic OFF after 10 min idling. |

Sensors and Cables fitting the C118

| Application Characteristics | Part No. |
|---|-----------------------------|
| Optoelectronic Sensor as standard, 95 mm shaft (part of equipment C118BS, C118.1BS, C118.2BS and C118.3BS). | A1S30P95 * |
| same, with short shaft 35 mm. | A1S30P35 * |
| Optosensor, with increased light intensity, with 5 m cable firmly attached (part of C118.2BP and C118.3BP). | A1S36P95-5m |
| same, with short shaft 35 mm, and angularly attached cable, for narrow space applications. | A1S36WP35-5m |
| Laser type sensor for scanning distance up to 2 m, target to be marked with high reflection tape U1A006. | A1S37P * |
| Sensing wheel, twin type, wheel \varnothing 63 mm, 1000 pulses/meter for length detection, Speed measuring range 0... 1200 m/min. | A1L04B200 ** |
| Sensing wheel, twin type, wheel \varnothing 159 mm, 1000 pulses/meter for length detection, Speed measuring range 0... 3000 m/min. | A1L05B500-5V ** |
| Speed sensor on differential Hall-effect basis, detecting steel profiles, or magnets, at any speed, under tough conditions, under oil or water. | A5S07C50-2mP |
| Speed sensors on magnetic-inductive (active) basis, to detect varying external magnetic fields. Specials for speed measurement of turbochargers on ships. | Sensor series A2S... *** |

*) connection cable type SAK
(in standard equipment with 2 meters length)

**) connection cable type L3A25BP

***) connection cable type L2A16BP

All cables available with length of 2 m, 5 m, 10 m.

Notes to sensor selection and how to mark the target

Optoelectronic type sensors

There is hardly another type of sensors fitting better to varying applications as the non-contact optoelectronic versions do. The target is fast and easily prepared. The automatic signal conditioning, incorporated with the C118, accepts a line of paint, a hole, or a screw, or a blade as a mark.

Important however, that it has a strong contrast to the background. An excellent means is a piece of the high reflection strip (U1A006) taped on the target.

The target itself may be any sized part (a wheel, shaft or disk, for instance), made of any material, metal or plastics. Since there is no reaction to the object under measurement, this may be a small and light part, also running at high speed. The only requirement is to keep the spot of measurement clean.

For the mark, a length of 1 cm in direction of run (even less at smaller shafts) will be adequate. A crooked surface (fan or turbine blade) will best be marked by a piece of the high reflection tape (U1A006).

If several marks are used (to get a faster reaction at a slow motion), they should be placed with equal distances between them.

The acceptable scanning distance (clearance) widely depends on the contrast of the mark. In general, it will be 0.5 to 2 cm, more with the high reflection mark applied. With this as pre-condition, the Laser type sensor A1S37P may achieve up to 2 meters.

The sensor A1S36P95 has been designed for heavy ambient conditions, at paper machines (felts), for instance. The firmly attached cable protects against humidity or steam, and its especially intensive light may overcome a faint marking contrast.

Oscillating light as emitted from AC-supplied illumination may pretend a speed to the instrument (50 Hz = 3000 RPM), even if reflected somewhere. This may cause irritations, and the sensor should be protected against.

It is important to hold the sensor steadily (in reference to the target). Mostly, a support to the hand will be adequate. Critical applications (low speed, narrow clearance) may require a firm clamping of the sensor. The magneto-based adjustable clamp U9A001 will be a practical aid, specifically to the Laser type sensor A1S37P.

**A1S30P95,
the standard for
optoelectronic
sensing**

**A1S37P,
the sensor for
large distance**

**A1S36P95,
the sensor for
humid ambiance,
and with en-
hanced light**

**Magneto-based
sensor clamp
U9A001**

Sensors with function principle based on magnetic field

Typical application is the speed detection of a rotating gear wheel, or similarly profiled part, with steel as material. May be used under oil, or water, or within a greasy ambience.

Sensing distance (clearance) typical 0.5 ...2 mm. Therefore, a firm support is indispensable. All these sensors have a mounting thread on their body.

Magnetic type sensors detect rotating steel profiles, even under oil or water

Various sensors are available with different characteristics:

The differential Hall-effect sensor A5S07B50-2mP have a very fine spatial resolution: detecting gear size as small as module 1 (pitch 25), large frequency range from close to zero up to 12,000 pulses / second. Equally strong output signal over this entire range. The differential principle balances target vibrations, and external static magnetic fields. Rotating magnets however will be detected. Wide acceptable temperature range from -40 °C ...+125 °C.

Advantageous characteristics of Hall-effect sensors A5S...

Magnetic induction type sensors are active, but limited to rather high speed, as in turbo-blower engines. Further, to detect AC magnetic fields, as in the neighborhood of ignition coils, electrical motors, or generators.

Not recommended at low speed, because of the then low output voltage.

Magnetic (active) sensors A2S...

See specific data sheets for further information.

Wheel type Sensors

Detecting the surface speed of a wheel (roll), or the material speed of a web, running belt, and similar.

Further use to length totalizing, by the SF function of the C118 instrument.

Always place the sensor to be pulled (not pushed) by the motion. For a longer term application suspend it by a bar (20 mm Ø) through its transversal bore hole.

High resolution and large speed range will be provided by the twin wheel sensor A1L04B200 (0-1200 m/min) resp. A1L05B500-5V (0-3000 m/min), see specifications.

Surface speed measurement and length totalizing by wheel type sensors A1L...

Operating the C118

Connections

Analog and Pulse Output

2 front side BNC jacks provide the analog output and the pulse output. Available is a ready-made cable U1H014, with BNC connectors on both ends.

Connecting the analog output or pulse output

Sensor Input

The standard reflection type sensor A1S30P can be pushed into the front side socket immediately, or connected by the SAK type cable. This socket accepts the other sensors (see page 6), too. Please observe the guiding slot at the socket. The screw at the connector will be downside.

Sensor Connection

For other signal sources, the ready-made cable L2A12PS-2m may be used, or wire according to this pin diagram:

- 1 = sensor supply +5 volts / 47 ohms source impedance
- 2 = aux load resistor 820 ohms versus zero
- 3 = sensor supply +5 volts/ max 60 ma
- 4 = signal input
- 5 = 0 v (common zero)

Part No. of connector: STP6S.

Power Supply Input

The single metallic jack at the front accepts the cable from the power supply unit U1H008. It powers the instrument, if not batteries or rechargeable cells are used.

Power Input

Power Supply

Mostly used, for best flexibility, are batteries (MN1500x4) or re-chargeable cells (IECR6). They are inserted into the battery case underneath.

Further, the supply unit U1H008 may be used. Its output cable will be plugged into the front side metallic jack.

Note:

The supply unit cannot re-charge the cells. To re-charge those, they must be inserted into the charger unit U1H009.

To remove the battery case cover, pull it to the rear, as indicated by OPEN. If necessary, use a knife blade.

When inserting the batteries or cells, watch for their correct polarity, as indicated by symbols at the bottom of the case, opposite to each other. Then re-insert and close the case cover.

Part No. of the case cover: BOS800-802-B.

Power ON/OFF

The ON/OFF key switches power to the instrument. Further it may be programmed to automatically switch off by itself, when idling for approximately 10 min. Saves the batteries, if unit inadvertently left on.

Function and characteristics used prior to shut-off are memorized. Thus, the instrument returns to continue the last job.

Measurements and memorized MAX/MIN/AVG values however are cancelled.

The instrument automatically checks for adequate supply voltage. In the critical phase, readings periodically alternate between measurements and LP (low power), still being valid. It is time, however, to replace the batteries.

When the supply voltage drops to an inadequate level, the display locks, reading the last measurement, or LP. If the instrument is switched on under not adequate power, the display remains blank or may show illegible signs.

**Powered by
batteries, cells,
or from mains by
supply unit**

**Battery
replacement**

ON/OFF

**Supply voltage
monitor**

Input Signal Conditioning

In its normal mode, the input of the C118 automatically adapts to the characteristics and size of the input signal. It adjusts the signal gain, and eliminates erratic pulses, as frequently generated in photoelectric sensing by scratches and stains on the target surface.

Though very helpful to an uncritical use of the photo-reflection sensors, it might be detrimental to a signal having a natural modulation of its amplitude, such as from active magnetic sensors scanning a gear wheel, or similar. With such applications, the automatic mode can be shut off:

Whilst the AVG key is kept depressed, actuate the FIX/VAR key for approximately 1 sec. On the display, a sign AUT OFF will show up, indicating that the previously explained automatic now is disabled.

Follow the same procedure, to return to the normal mode, and the AUT OFF sign will disappear.

The previous mode will be maintained when switching power OFF/ON from the instrument.

Manual adjustment of the maximum sensitivity (Model Nos. C118.2 and C118.3 only).

The fast automatic signal conditioning might lose its correcting function when the signal frequency drops below approximately 100 pulses per minute. With low speed applications (typical: photo reflection scanning of rolls and felts in paper machines), the automatic signal conditioning can be supported and improved by a manual preset of the maximum sensitivity, as provided with these versions.

They have a turning knob on their front. Turning it counter-clockwise (view to the front), reduces the sensitivity and helps to suppress noise signals. In its full clockwise position, the instrument performs like standard.

Input Response Indicator

The LED on top, marked INPUT SIGNAL, indicates the acceptance of the input signal. Flashing at every input pulse at low rate, it will appear to light steadily at a higher rate. Irregular lighting indicates inadequate signal acceptance. Improve marking, go closer and/or eliminate an interfering light. At low speed, watch for double or multiple blinking, signaling eddy pulses. Increase distance then, or (with models C118.2 and C118.3) reduce sensitivity.

Automatic signal conditioning = normal mode

Applications requiring Automatic Off mode

How to switch to AUT OFF

Manual preset of the maximum sensitivity in between signal pulses (C118.2.. and C118.3.. only)

LED INPUT SIGNAL: a guide to steady input signal acceptance

No reliable measurement can be expected unless the input signal is clearly accepted!

Note:

The input indicator may still be operational with the power supply no longer adequate.

**The
indispensable
pre-condition
to reliable
measurements**

MAX/MIN/AVG Function

The C118 detects and memorizes the highest (MAX) and the lowest (MIN) measurement within a controlled period of time. From those, it further computes the average (AVG) of all measurements.

**MAX/MIN/AVG
memorizing**

Begin and end of this evaluation period is controlled, under continued measurement, by the BEGIN/END key. First actuation start memorizing, next one stops it. Display FUNC/RUN indicates the function as being active. Once it has been terminated (power left on), the results can be recalled to display by the key MAX/MIN/AVG. Power OFF switching cancels the memorized values.

Note: Do not change the measuring mode or other terms during the evaluating period.

Time Base of Readings

The facility of the C118 converts the originally measured signal frequency into readings with a corresponding time base, as indicated at the display. Select desired time base by the key marked /h /min /sec /SF. The conversion has no influence to the measuring sequence, nor to the updating sequence of the display.

**Time base of
speed readings
/h
/min
/sec**

Totalizing

SF evokes a totalizing function within the instrument. It is started and stopped by the BEGIN/END key, as described above. Starting simultaneously cancels the previous result. In FIX mode, the display reads the incoming signal pulses, reduced by the input pre-divider as programmed by P09. In VAR mode, they are further scaled by the computing factor, as programmed in steps No. 02 ... 04. The programmed mode, multiplying or dividing, and the factor, result in correspondingly enlarged or reduced reading steps per input pulse. If the corresponding reading step thus results in a fraction, a decimal point in display can be set by program step P10.

**SF = totalizing
function**

The totalizer capacity is up to 99999. Overflow will cause errors.

The analog output cannot be used in this SF mode.

Operating Modes FIX and VAR

This is one of the facilities making the C118 that much useful. Select between both modes by actuating the FIX/VAR key. VAR mode is indicated by a sign in the display. Programmed parameters will not be deleted when switching to FIX.

**FIX = straight
tachometer
VAR = using the
computing
facilities**

FIX mode

Measuring the rotational speed, with these firm characteristics:

Calibrated to 1 pulse per revolution. Minimum measuring time = 1 sec. Low end = 30 pulses / min.

Readings in terms of /sec, or /min (RPM), or /hour, as selected by this key.

FIX mode uses a floating decimal point:

Starting with one decimal at low speed. With measurements above 10000.0, the last digit is kept on zero, to avoid flickering readings. The decimal point is cancelled when the measurement exceeds 99999.0.

Note: The thus achieved decimal selection will be maintained with decreasing measurements. Return to the initial decimals sequence by switching the instrument off/on.

Totalizing (SF) may be used, counting the input pulses, not scaled, but reduced by the preset input pre-divider.

Further effective the MAX/MIN/AVG memory. Also the analog output, using the characteristics, as programmed.

**FIX
characteristics**

VAR mode

This mode activates all the capabilities included into the MOVIPORT C118, by programmable parameters, as described in the subsequent chapters.

Programming can be done at any time, and in any mode. The thus defined functions become effective in the VAR mode only.

Note:

This feature assigns two readings to one measurement, selected just by switching between FIX and VAR. For instance, the rotational speed by FIX, and the circumferential speed by VAR as computed from its circumference. Or, the measured input speed of a gear in FIX, and the output speed in VAR, as computed from its turn down ratio.

**VAR
mode facilities**

**Programming
procedure and
parameters list
on page 14**

**Two readings
utilizing one
measurement**

Programming the C118

List of Program Steps (effective only in VAR mode)

| Step | Function handled | Page |
|------|---|------|
| 00 | minimum measuring time, determines sequence (by steps) | 15 |
| 01 | maximum measuring time, determines low speed (by steps) | 15 |
| 02 | Computing factor: multiplying mode = parameter 0 dividing mode = parameter 1 | 16 |
| 03 | Computing factor: number of factor decimals | 16 |
| 04 | Computing factor: numerical value of factor | 16 |
| 05 | Speed display readings position of decimal point | 16 |
| 06 | Analog output reading assigned to high end | 17 |
| 07 | Analog output reading assigned to low end | 18 |
| 08 | Automatic power off parameter 0 = no, 1 = after 10 min | 18 |
| 09 | Input frequency divider factor (001...255) | 18 |
| 10 | Totalizing function position of decimal point at SF | 19 |

Programming Procedure

Note: Programming can be done in both modes FIX and VAR.

Programmed characteristics however get valid in VAR mode only.

In FIX mode, all functions are as listed on page 5.

Press key PROG to enter the programming phase. Step 00 appears blinking. To enter a higher or lower step, use keys Δ , or ∇ . The thus addressed program No. blinks.

When in the desired step (see list of steps above or at bottom of the instrument), use key \square to enter the parameter. Numerical parameters are set digit by digit, starting at the right end digit. The one addressed blinks. Select higher or lower values by the keys Δ , or ∇ . Move to the next digit to the left by key \square , and set this accordingly. With parameters to be set step by step, or as decimal point position, use \square to move it. When the parameter is properly set, touch key PROG to acknowledge, and move to next program step. Set it, following the same procedure. Before leaving a step, acknowledge by PROG.

To leave the programming phase touch key PROG again.

Note: all parameters are kept safe, when the unit is switched off.

Programmable Characteristics – Parameter Functions

(effective only in VAR mode)

Minimum Measuring Time Allowance

All rate measurements are based on a time interval measurement over a (automatically varying) number of input signal pulses. A programmable minimum measuring period thus will be maintained, automatically including more and more pulses into every measurement with increasing input frequency. This establishes an averaging over the programmed period of time, which helps to stabilize the measurements, specifically with fluctuating variables. A measuring time of 0.5 sec or 1 sec has proven adequate for most applications. A shorter period should only be selected to trace a fast variation (by the analog signal output). Heavily fluctuating input sequences however may require a longer measuring period.

The parameter of P00 defines the minimum measuring period of time, offering this selection:

0.03 – 0.06 – 0.12 – 0.25 – 0.5 – 1 – 2 – 4 – 8 sec.

Select directly by keys Δ , or ∇ .

Step No. 00
minimum measuring time allowance, determines tracking sequence but also steadiness of readings

Maximum time allowance for one measurement

This program step sets a limit to the maximum time, allowed for one measuring period. With decreasing signal frequency, the pulse distance, and thereby the measuring sequence, becomes longer and longer. When this time exceeds the limit set in this step, measurement is interrupted, and the instrument reads zero speed. This defines the low end of function.

Note: if the input signal cancels abruptly, the instrument does not wait for the programmed maximum time, but reduces its readings (and the analog output) with a specific sequence, which is based on the last performed measurement.

The program offers these selections for the maximum time, using the keys Δ , or ∇ .

0.06 – 0.12 – 0.25 – 0.5 – 1 – 2 – 4 – 8 – .-. . This last selection allows an extremely slow sequence of 1200 sec. But the step down sequence, as explained above, will be rather slow then.

The shortest time allowance always is 2 times the minimum sequence. In practice, 4 sec is frequently used.

Step No. 01
longest time allowed for one measurement, determines the low end of frequency range

Computing (scaling) factor

One of the most fascinating facilities of the C118. It converts the measured signal frequency into readings in any required engineer unit, introducing a conversion factor, in a multiplying or dividing way.

The multiplying mode increases the measured value (speed) by the computing factor. A typical application is to convert a RPM measurement into readings of the circumferential speed of a roll: simply set the roll circumference as the multiplying factor. It can be in meter terms, or by ft to read m/min or ft/min, and with programmable decimals.

Set parameter of step 02 to “0” to achieve the multiplying mode.

The dividing mode, for instance, may be used to get the output speed of a gear, with the input speed being measured, and the gear step-down ratio is set as dividing factor. Another example is to read flowrate, from a flowmeter output frequency as the measured quantity. Set the flowmeter calibration factor (pulses per gallon, for instance) as the dividing factor.

Set parameter of step 02 to “1” to achieve the dividing mode.

Decimal point position of the computing factor

The display shows the digits by - - - - - and a decimal point. Move the decimal point shown to the desired position with key Δ . Decimal point at the extreme right means “no decimals”.

Computing factor numerically

Set the desired numerical value of the computing factor, with decimals as prepared in step No. 03.

Decimals in Speed Display

In VAR mode the decimal point can be set to any desired position, which will then be maintained for all measurements in VAR mode (except of the totalizing function SF). It also stays so, when switched to another time reference. Use the same procedure, as explained for step No. 03.

Notes:

If the actual speed thus exceeds the maximum of 6 digits, the reading will be blocked at 999990, with the decimal point held as programmed.

With readings exceeding 100000, with the decimal point wherever, the last digit is kept on zero.

Determining the relation between measurement and reading

Step No. 02

Mode of computing factor:
0 = multiplying
1 = dividing

Step No. 03

decimal point position in factor

Step No. 04

computing factor numerically

Step No. 05

decimals in speed display

Notes:

Do not select more decimals than necessary! If the high resolution thus achieved exceeds the stability of the variable, and the repeatability of the input signal, the last digits in display and analog output necessarily will fluctuate, and be useless.

For the totalizing function (SF) the decimal point is set in a separate step No.10.

Analog Output

The analog output repeats the displayed values, in all modes /sec, /min, or /h. It is not operational in the totalizing mode SF.

High end and low end of the conversion span are separately defined, by program steps No. 06 and 07.

The definitions refer to the numerical values only. If those vary, because of a change in the time reference /s, /min, /h, the output changes likewise. Consider this, when setting the span ends.

A change in the decimal point however, will not affect the span ends, the output sticks to the numerical value.

High End (4 volts) Assignment of the Analog Output

The parameter defines the displayed value assigned to the high end 4 volts of the output, however it may be achieved, disregarding the /s, /min, /h reference in action. But it considers the decimal point in reading, to maintain the output. For example, if 4 volts have been assigned to 250.00, it will be 4 volts also at 250.0 or 250.

If the measurement exceeds the high end, the output limits to approximately 4.06 volts.

Low End (0 volts) Assignment of the Analog Output

The parameter defines the display reading, which is assigned to 0 volt output, as a numerical value, disregarding the /s, /min, /h, as explained for the high end.

Commonly, 000000 is selected as the assigned value, to have the full range of the variable on the output. Setting a higher value however, enhances the resolution within the thus narrowed span – a very practical means to track small variations of the variable. Do not set the low end to more than 90 % of the selected high end (= 10 times enlargement).

Analog Output

Step No. 06
value assigned to
the high end
(4 volts)

Step No. 07
value assigned to
the zero end
(0 volts)

Automatic Power Shut-Off

To save battery capacity, the C118 can be automatically shut off, when idling for 10 min.

Step 08 enables this function by its parameter:

0 = function disabled

1 = function enabled

Step No. 08
Automatic Switch
Power Off

Input Frequency Pre-Divider

This facility is very helpful whenever several pulses per revolution (or other period) with unequal distance must be evaluated. For instance, screw heads on the rotating object placed at unequal angular positions. Piston and oval gear flowmeters may show unequal pulse spacing over one revolution, too.

Setting the parameter of this step to the number of pulses included into one revolution, the function will divide the incoming pulse rate accordingly. This returns the pulse sequence to one pulse per revolution, what obviously ensures the most accurate repetition, as the best basis for stable measurements. Setting range 001 ...255. Any higher number will be rejected.

For pulse to pulse measurements (to trace variations in the angular speed), or at very low speed (to avoid an early shut-off by the maximum measuring time), leave the parameter at 001.

Note:

All adjustments refer to the divided input frequency.

The pulse output repeats the divided input frequency.

Step No. 09
Input frequency
Divider

Decimals in Totalizing Mode SF

If the count step width in totalizing is a fraction of the requested quantity unit, as given by the application and/or the computing factor, a decimal point can be set into the display. Follow the procedure as described for Step No. 05.

Step No. 10
Decimals in
Total Readings

Parameters set on delivery (default values)

| Step No. | Function | Value |
|----------|------------------------|--------------|
| 00 | Minimum Time Allowance | 0.50 s |
| 01 | Maximum Time Allowance | 8.00 s |
| 02 | Computing Factor | Mode |
| 03 | | decimals |
| 04 | | numerical |
| 05 | Display decimals | ----- (none) |
| 06 | Analog Output | high end |
| 07 | | low end |
| 08 | Automatic Power off | 1 (active) |
| 09 | Input Pre-Divider | 001 |
| 10 | Decimals in SF Display | ----- (none) |

Serial Data Interface

General Characteristics

Mode: RS232, without handshake leads.
4800 baud, 8 bits, no parity.

Communication provided

The interface provides results from all type measurements performed in the C118. It uses its own protocol: the transmission must be requested, and any request can call for one type of measurement only.

As required by the message, this transmission may be repeated continuously, with updated results, or sent only once after request.

Transmission

Request message syntax

STX n H z ETX

The type of measurement required is defined by a figure (n) in the syntax:

- n = 1: actual most recent measurement
- 2: minimum memorized value
- 3: maximum memorized value
- 4: computed average
- 5: total from SF function

H = firm sign

z = required mode of transmission:

0 = one response only after request

1 = continuous transmission

stopped by message STX n H 0 ETX

Response syntax

STX/ n/ kXXXXXXXX CR ETX

n = Data type according to the above key

k = Number of decimals in the subsequent result.

This then is transmitted without a decimal point.

Data handling

Request to transmit

Transmission

Note:

STX, ETX, CR are **not** to be understood as a sequence of capitals, but as ASCII signs:

STX (start of text), in HEX code = 02

ETX (end of text), in HEX code = 03

CR (carriage return) in HEX code = 0D

Important Note
frequent cause
of failures

Connection cable L3D01 and Data Port

Connector type of cable L3D01:

USB Mini-B male to 9 pole SUB-D male

**Wiring of
data port**

pin No. signal

| | |
|---|-------------|
| 2 | RxD ← |
| 3 | TxD → |
| 5 | common zero |

Note:

For programming separate RS232 adapter cable L3D01 is required.

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