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Operating Instructions

VRZ 401, VRZ 405 HEIDENHAIN Display Units



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1. Items supplied

HEIDENHAIN counter VRZ 401/405 (type as ordered)
Fuse for 200 ... 240 V~ incorporated
Fuse for 100 ... 140 V~ in package
Mains cable
Operating Instructions with Parameter Chart
Certificate of Inspection

2. Brief description – Outline

HEIDENHAIN linear encoders with 10 µm, 20 µm, 40 µm (only with VRZ 401) or 100 µm grating period, HEIDENHAIN-METRO gauges as well as HEIDENHAIN rotary encoders with sinusoidal output signals are suitable for connection. The output signals are amplified, interpolated within the HEIDENHAIN counter and subsequently counted in accordance with the sign. The measured value is displayed via a seven-digit 7-segment digital display. Owing to the gold-coloured numerals, the display is easy to read.

The counters are provided with the following functions:

	VRZ 401	VRZ 405
Data output		V.24/RS-232-C
Functions	Zero reset Datum set Reference mark evaluation REF of individual and distance-coded reference marks mm/inch calculator selectable display step selectable counting direction selectable grating period	

3. Notes

Counters VRZ 401/405 correspond to protection class I of the German VDE regulations VDE 0411 and have been built and checked in accordance with DIN 57411 part 1/VDE 0411 part 1 "protective measures for electronic measuring units". In order to maintain this condition and to assure safe operation please adhere to the **notes and instructions** as contained herein.

Maintenance

These instructions contain all details required for commissioning and operation of the counters. The units are maintenance-free. In the case of any fault or failure we recommend return of the counter to our works Traunreut or to your local supplier.

Caution!

Do not engage or disengage any connectors whilst under power.

Manufacturer's certificate

We hereby certify that the above unit is radioshielded in accordance with the West German official register decree 1046/1984.

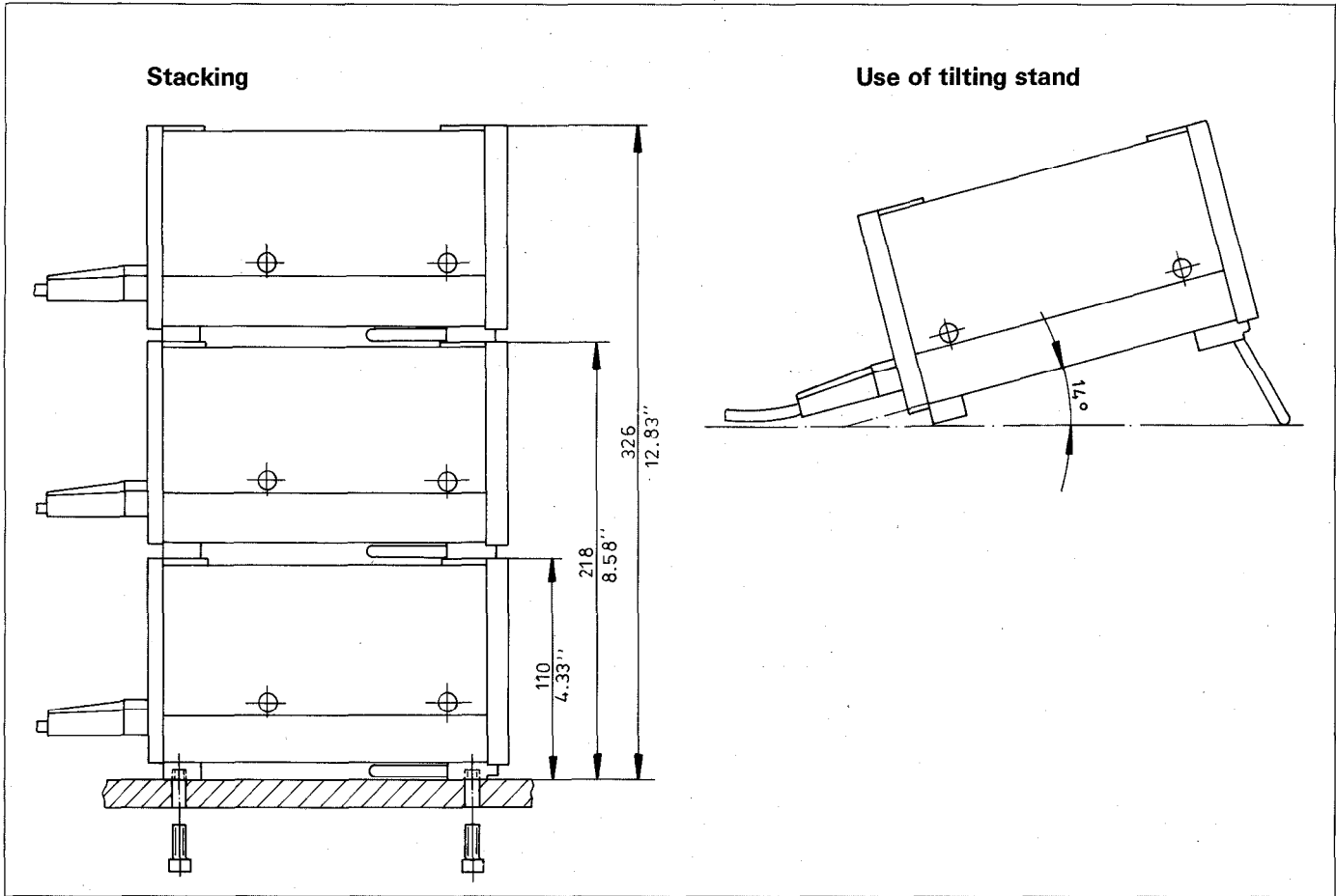
The West German postal authorities have been notified of the issuance of this unit and have been granted admission for examination of the series regarding compliance with the regulations.

Information:

If the unit is incorporated by the user into an installation then the complete installation must comply with the above requirements.

4. Installation

The counter is designed as a desk-top unit.
For easier readings it can be tilted by approx. 14° by means of a collapsible stand. The feet of the unit are provided with M5 tapped holes for fixing to a base plate. Several counters can be **stacked** by simply putting one on top of the other. Slipping of stacked counters is prevented by the housing rim as well as by small protrusions in the housing cover.



5. Selection of mains voltage

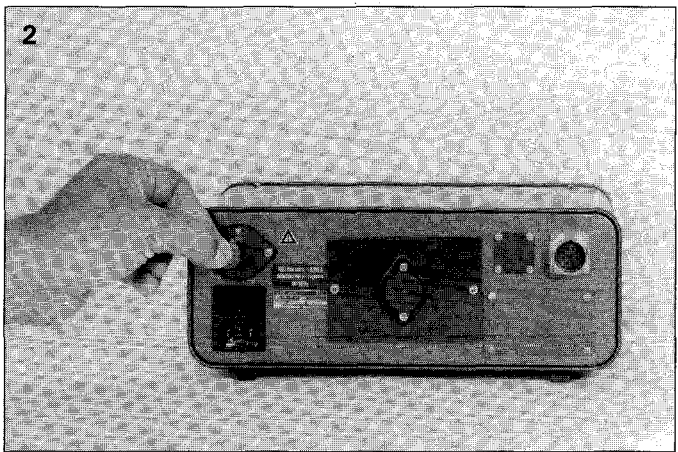
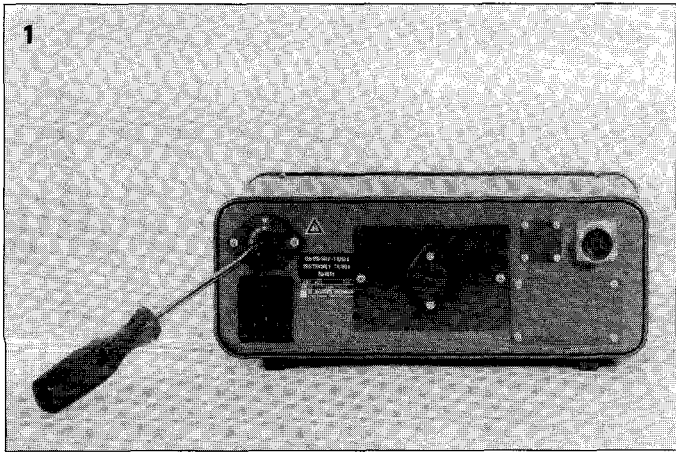
Counters VRZ 40X are set to 220 V operation when supplied. This may be changed to 100, 120, 200, 240 V as follows:
Remove mains fuse holder (Fig. 1) and set voltage selector to the required rating by means of a coin (Fig. 2). Replace mains fuse holder with correct fuse.

with VRZ 401

- Fuse for 200/220/240 V~ 0.125 A slow-blow
- Fuse for 100/120/140 V~ 0.25 A slow-blow

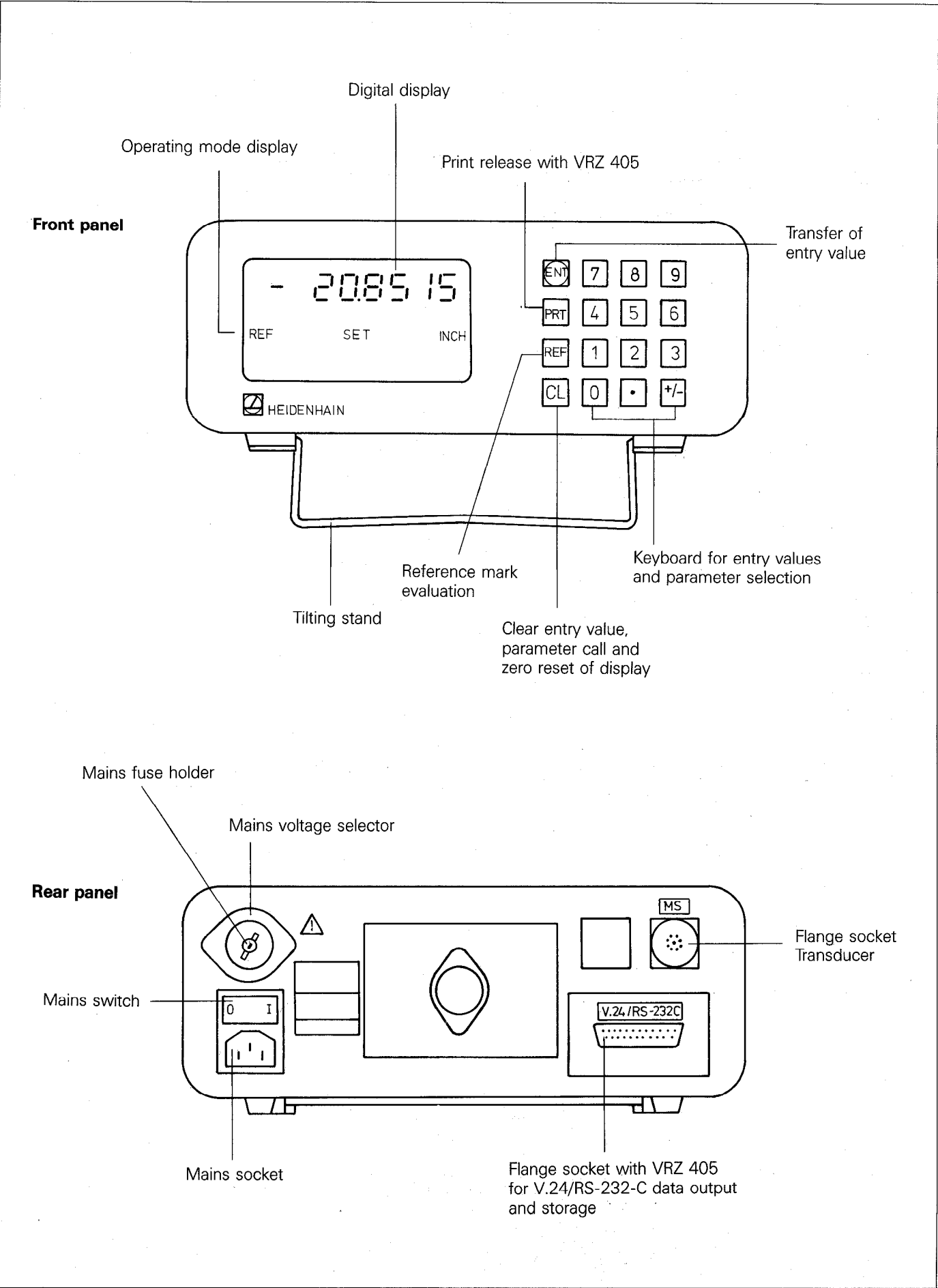
with VRZ 405

- Fuse for 200/220/240 V~ 0.16 A slow-blow
- Fuse for 100/120/140 V~ 0.315 A slow-blow



6. Starting procedure

6.1 Controls



6.2
Switch-on of counter

The digital display flashes after switch-on (mains switch at counter rear). This signalizes that the displayed value does not correspond to the last selected datum value due to the preceding power interruption.

- a) With **initial activation** the flashing of the display can be cancelled by pressing the **REF**-key twice. The counter is now ready for setting the operating mode (see item 6.3).
- b) With any **further activation** press **REF**-key once. The digital display illuminates; flashing of the **REF** display field requests traversing the reference mark of the encoder for retrieval of the last selected correlation between encoder position and display value (see item 7.3.2). If this correlation is effected via zero reset or datum set after probing of a mechanical limit stop (reference surface), the **REF**-key is to be pressed twice (see 7.3.3).

6.3
Setup functions

VRZ 40X is provided with a number of selectable functions (see tables as of page 6). The required operating mode is determined by entry of parameter values.

6.3.1
Parameter-entry

Parameter call-up

Simultaneous pressing of **CL** and of the number of the selected parameter. The parameter value last entered is displayed.

press (e. g.)

CL + **7 8 9**
4 5 6
1 2 3
0

display (e. g.)

P2 0

Enter parameter value

Enter value for required operating mode.

1

Parameter ————
Parameter value ————

P2 1

Storing parameter value

By pressing **ENT**, the selected parameter value is stored. The required operating mode is now set.

ENT

000002
INCH

Non-volatile storage of entered parameter values. When resuming operation the counter operates in the last entered mode.

6.3.2
Parameter Overview

6.3.2.1
VRZ 401



Key	Function	Parameter		Input																																						
CL + 0	Radius/Diameter display	P0		0 Radius display 1 Diameter display																																						
CL + 1	Counting direction	P1		0 normal 1 inverse																																						
CL + 2	mm/inch conversion	P2		0 mm display 1 inch display																																						
CL + 3	Display step	P3		<table><tr><th></th><th>mm display</th><th>inch display</th><th colspan="2">Parameter</th></tr><tr><th></th><th></th><th></th><th>P4</th><th>P0</th></tr><tr><td>0</td><td>X.XXX5 X.XX1 X.XX2</td><td>X.XXX X2 X.XXX X5 X.XXX1</td><td>0 1 1</td><td>0 0 1</td></tr><tr><td>1</td><td>X.XX1 X.XX2</td><td>X.XXX X5 X.XXX1</td><td>0 1</td><td>0 1</td></tr><tr><td>2</td><td>X.XX5 X.X1 X.X2</td><td>X.XXX2 X.XXX5 X.XX1</td><td>0 1 1</td><td>0 0 1</td></tr><tr><td>3</td><td>X.X1 X.X2</td><td>X.XXX5 X.XX1</td><td>0 0</td><td>0 1</td></tr></table>		mm display	inch display	Parameter					P4	P0	0	X.XXX5 X.XX1 X.XX2	X.XXX X2 X.XXX X5 X.XXX1	0 1 1	0 0 1	1	X.XX1 X.XX2	X.XXX X5 X.XXX1	0 1	0 1	2	X.XX5 X.X1 X.X2	X.XXX2 X.XXX5 X.XX1	0 1 1	0 0 1	3	X.X1 X.X2	X.XXX5 X.XX1	0 0	0 1								
	mm display	inch display	Parameter																																							
			P4	P0																																						
0	X.XXX5 X.XX1 X.XX2	X.XXX X2 X.XXX X5 X.XXX1	0 1 1	0 0 1																																						
1	X.XX1 X.XX2	X.XXX X5 X.XXX1	0 1	0 1																																						
2	X.XX5 X.X1 X.X2	X.XXX2 X.XXX5 X.XX1	0 1 1	0 0 1																																						
3	X.X1 X.X2	X.XXX5 X.XX1	0 0	0 1																																						
CL + 4	Grating Period/ Reference mark evaluation	P4		<table><tr><th></th><th>Grating Period</th><th>Reference mark</th></tr><tr><td>0</td><td>10 μm 100 μm</td><td rowspan="2">single</td></tr><tr><td>1</td><td>20 μm 200 μm 40 μm</td></tr><tr><td>2</td><td>10 μm</td><td rowspan="4">Distance-coded with 1000 1000 2000 2000 } x grating period</td></tr><tr><td>3</td><td>20 μm</td></tr><tr><td>4</td><td>10 μm</td></tr><tr><td>5</td><td>20 μm</td></tr></table>		Grating Period	Reference mark	0	10 μm 100 μm	single	1	20 μm 200 μm 40 μm	2	10 μm	Distance-coded with 1000 1000 2000 2000 } x grating period	3	20 μm	4	10 μm	5	20 μm																					
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CL + 5	Blinking display – Function of CL key	P5		<table><tr><th rowspan="2"></th><th rowspan="2">Function of CL key</th><th colspan="2">Blinking display after</th></tr><tr><th>Switch-on</th><th>Fault</th></tr><tr><td>0</td><td>Clears the display and redisplay the previous value</td><td>● yes</td><td>● yes</td></tr><tr><td>1</td><td>Sets the display to “0”</td><td>● yes</td><td>● yes</td></tr><tr><td>2</td><td>Clears the display and redisplay the previous value</td><td>● yes</td><td>○ no</td></tr><tr><td>3</td><td>Sets the display to “0”</td><td>● yes</td><td>○ no</td></tr><tr><td>4</td><td>Clears the display and redisplay the previous value</td><td>○ no</td><td>● yes</td></tr><tr><td>5</td><td>Sets the display to “0”</td><td>○ no</td><td>● yes</td></tr><tr><td>6</td><td>Clears the display and redisplay the previous value</td><td>○ no</td><td>○ no</td></tr><tr><td>7</td><td>Sets the display to “0”</td><td>○ no</td><td>○ no</td></tr></table>		Function of CL key	Blinking display after		Switch-on	Fault	0	Clears the display and redisplay the previous value	● yes	● yes	1	Sets the display to “0”	● yes	● yes	2	Clears the display and redisplay the previous value	● yes	○ no	3	Sets the display to “0”	● yes	○ no	4	Clears the display and redisplay the previous value	○ no	● yes	5	Sets the display to “0”	○ no	● yes	6	Clears the display and redisplay the previous value	○ no	○ no	7	Sets the display to “0”	○ no	○ no
	Function of CL key	Blinking display after																																								
		Switch-on	Fault																																							
0	Clears the display and redisplay the previous value	● yes	● yes																																							
1	Sets the display to “0”	● yes	● yes																																							
2	Clears the display and redisplay the previous value	● yes	○ no																																							
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5	Sets the display to “0”	○ no	● yes																																							
6	Clears the display and redisplay the previous value	○ no	○ no																																							
7	Sets the display to “0”	○ no	○ no																																							

Transfer to memory

6.3.2.2
VRZ 405

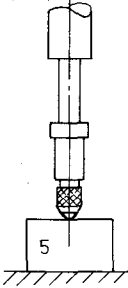
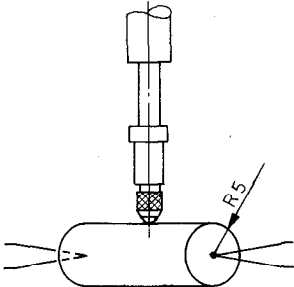


Key	Function	Parameter	Input		
CL + 0	Output of blank lines between value outputs via the data interface	P0	Enter number of blank lines		
CL + 1	Counting direction	P1	0 normal 1 inverse		
CL + 2	mm/inch conversion	P2	0 mm display 1 inch display		
CL + 3	Display step	P3	mm display	inch display	Parameter P4
			0 X.XXX5 X.XX1	X.XXX2 X.XXX5	0 1
			1 X.XX1	X.XXX5	0
			2 X.XX5 X.X1	X.XXX2 X.XXX5	0 1
			3 X.X1	X.XXX5	0
CL + 4	Grating Period/ Reference mark evaluation	P4	Grating Period	Reference mark	
			0 10 µm 100 µm	single	
			1 20 µm 200 µm		
			2 10 µm	Distance-coded with 1000 1000 2000 2000 } x grating period	
			3 20 µm		
			4 10 µm		
			5 20 µm		
CL + 5	Blinking display – Function of CL key	P5	Function of CL key	Blinking display after	
				Switch-on	Fault
			0 Clears the display and redispays the previous value	● yes	● yes
			1 Sets the display to "0"	● yes	● yes
			2 Clears the display and redispays the previous value	● yes	○ no
			3 Sets the display to "0"	● yes	○ no
			4 Clears the display and redispays the previous value	○ no	● yes
			5 Sets the display to "0"	○ no	● yes
			6 Clears the display and redispays the previous value	○ no	○ no
			7 Sets the display to "0"	○ no	○ no
CL + 6	Baud Rate	P6	1 150 baud 2 300 baud 3 600 baud 4 1200 baud 5 2400 baud		

6.3.3
Functions/Operating modes

6.3.3.1
Nominal/Diameter display (with VRZ 401)

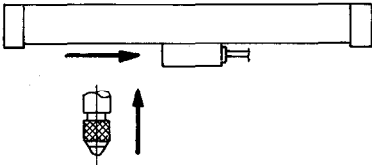
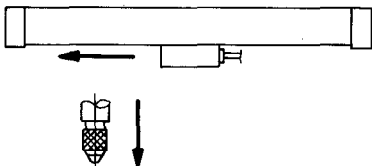
Via parameter 0 the VRZ 401 can be converted from Nominal display (display value corresponding to travel) to Diameter display (value corresponding to double the travel).

Parameter	Parameter value	Travel	Display value
P0	0		5.000
P0	1		10.000

Exception: When connecting encoders with 40 µm grating pitch the parameter value P0 1 must principally be set. The display value then corresponds to the travel.

6.3.3.2
Counting direction

Conversion of the counting direction is effected via entry of the value of parameter P1.

Parameter	Parameter value	Scanning head/Plunger movement	Counting mode
P1	0		- 0.0010 mm - 0.0005 mm 0.0000 mm positive 0.0005 mm 0.0010 mm
P1	1		- 0.0010 mm - 0.0005 mm 0.0000 mm negative 0.0005 mm 0.0010 mm

6.3.3.3
mm/inch-display

The measured value can be optionally displayed in “mm” or “inch”. Determination is effected via value entry in parameter P2. This is also possible during measuring.

Parameter	Parameter value	Display	Unit
P2	0	25.4000	mm
P2	.1	1.00000 INCH illuminates	inch

6.3.3.4
Display step

The display step can be either set to depending on the connected measuring system.

Parameter	Parameter value	Display step				for encoders with
		mm		Inch		
		Nominal	Diameter (only on VRZ 401)	Nominal	Diameter (only on VRZ 401)	
P3	0	0.0005	0.001	0.00002	0.00004	10 µm grating period/ 36000 lines
		0.001	0.002	0.00005	0.0001	20 µm grating period/ 18000 lines
		0.002*	–	0.0001*	–	40 µm grating period/ 9000 lines
P3	1	0.001	0.002	0.00005	0.0001	10/20 µm grating period/ 18000/36000 lines
		0.002*	–	0.0001*	–	40 µm grating period/ 9000 lines
P3	2	0.005	0.01	0.0002	0.0004	100 µm grating period/ 3600 lines
		0.01	0.02	0.0005	0.001	200 µm grating period/ 1800 lines
		0.02*	–	0.001*	–	900 lines
P3	3	0.01	0.02	0.0005	0.001	100 µm grating period/ 3600/1800 lines
		0.02*	–	0.001*)	–	900 lines

* Valid only for VRZ 401; here the parameter P0 is to be set to the parameter value 1 (Diameter display).

6.3.3.5
Setting of grating period – normal/distance-coded reference marks

Encoders with 10 µm, 20 µm, 40 µm (only with VRZ 401), 100 µm or 200 µm and rotary encoders with various line counts are connectable to the VRZ 401/405 provided that they have sinusoidal output signals. Via parameter 4 the counters are adjusted to the grating periods/line counts and the various reference marks – normal or distance-coded – are taken into account.

Linear encoders

Parameter	Parameter value	Reference marks	Grating period	Encoder	
P4	0	normal	10 μm	METRO Length gauge LID 300/310/ 320/350/400	
			100 μm	LB 326 LIDA 201/225	
P4	1		20 μm	LS 107 LS 403/404 LS 703/707 ULS 300 LID 320/400	
			40 μm	LIDA 190/40	
			200 μm	LIDA 190/200	
P4	2	distance-coded	10 μm	LS 101C	
P4	3		20 μm	LS 107C LS 303C LS 403C/404C LS 603C LS 703C/704C ULS 300C	
P4	4		10 μm	LID 351C, LID 311C	

Rotary encoders

Parameter	Parameter value	Line count	Rotary encoder
P4	0	36 000	ROD 700 ERO 725/815 ROD 151/450/456 RON 155/455 MINIROD 450
		3600	
P4	1	18 000/9000	ROD 250/700 RON 255/705 ERO 725/815 ROD 151/450/456 RON 155/455 MINIROD 450 ERO 1251
		1800/900	

Since the VRZ 401/405 has no automatic reset after 360°, counting is continued beyond 359.999 for repeated revolutions (e.g. 2 revolutions: 720.000°).

Rotary encoders that serve to determine lengths, traverse or feedrates can also be connected. For such applications it is necessary to take the transmission ratio into account (rack and pinion, nut and spindle or circumference of the friction wheel) in addition to the interpolation factor and line count.

Caution: With the re-adjustment of the grating period all values momentarily stored in the display unit are simultaneously changed.

- P4 0 → 1 Values are doubled
- P4 1 → 0 Values are halved

6.3.3.6
Zeroing with CL key/Blinking display

Two functions are adjustable via parameter P5:

Zeroing with the CL key

The counter can be easily zeroed by pressing the **CL** key if the parameter value is adjusted to 1/3/5 or 7. With parameter values 0/2/4/6 the **0** and **ENT** keys must be pressed.

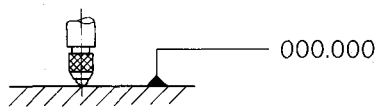
Display blinking

Display blinking after power interruption or switch-on or due to faults can be deactivated.

Parameter	Parameter value	Zeroing with the CL key	Display blinks after	
			switch-on	fault
P5	0	no	yes	yes
	1	yes	yes	yes
	2	no	yes	no
	3	yes	yes	no
	4	no	no	yes
	5	yes	no	yes
	6	no	no	no
	7	yes	no	no

7. Operation

7.1
Zero reset



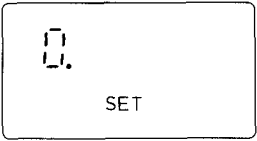
000.000

Counter can be reset to zero at any random location of the travel.

Press

0 0 key

▶ SET on
Zero appears on left of display.



Transfer key **ENT**

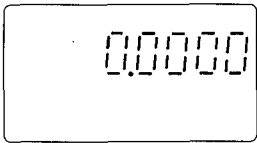
▶ SET off
Zero as datum appears on right of display.



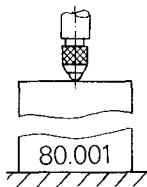
or, if Parameter P5 1 has been addressed.

CL Clear key

▶ Zero appears in display upon release of key.



7.2
Datum set



80.001

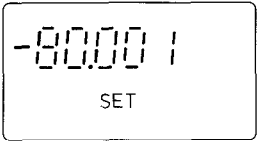
Any random number (e.g. the Nominal dimensions) can be set as reference datum (initial value).

Press

7 8 9
4 5 6
1 2 3
0

Enter datum
e.g. 80.001 mm
(3.150 in)

▶ SET on
Value appears on left of display



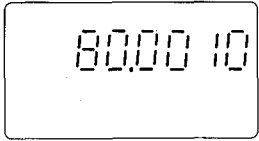
CL Clear key for wrong entry



+/- Entry of neg. sign after datum set, if reqd.

ENT Transfer key

▶ SET off
Datum value e.g. 80.001 mm (3.150 in) appears on right of display



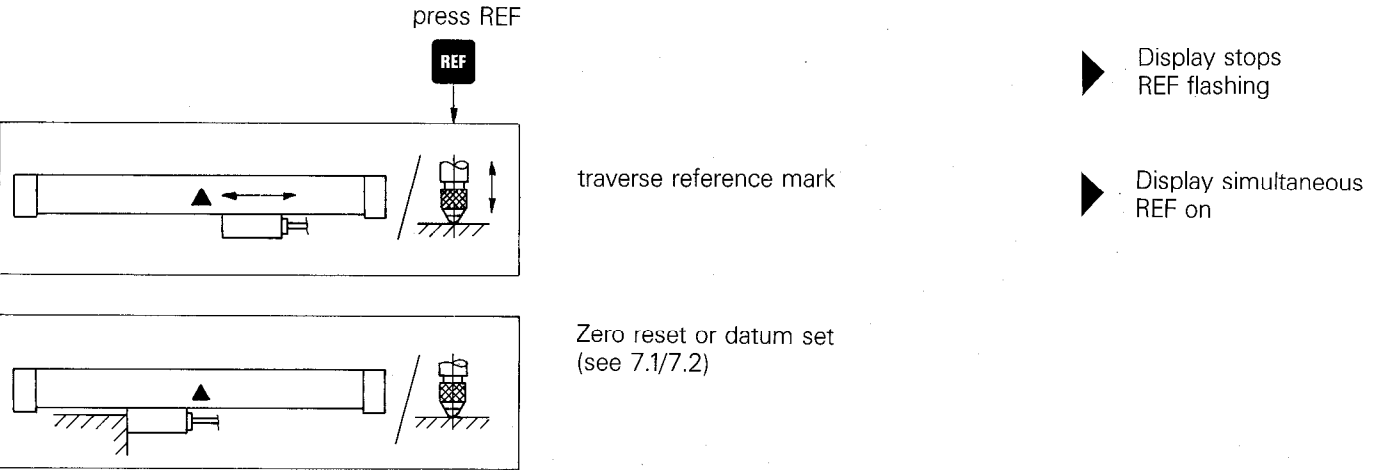
The datum value is rounded off in accordance with selected display step and mm or inch display.

entered datum value (last decade)	transferred datum value (last decade) with display step			
	0.0005 mm	0.001 mm	0.00002 inch	0.00005 inch
0	0	0	0	0
1	0	1	0	0
2	0	2	2	0
3	0	3	2	0
4	0	4	4	0
5	5	5	4	5
6	5	6	6	5
7	5	7	6	5
8	5	8	8	5
9	5	9	8	5

7.3
Reference mark evaluation REF

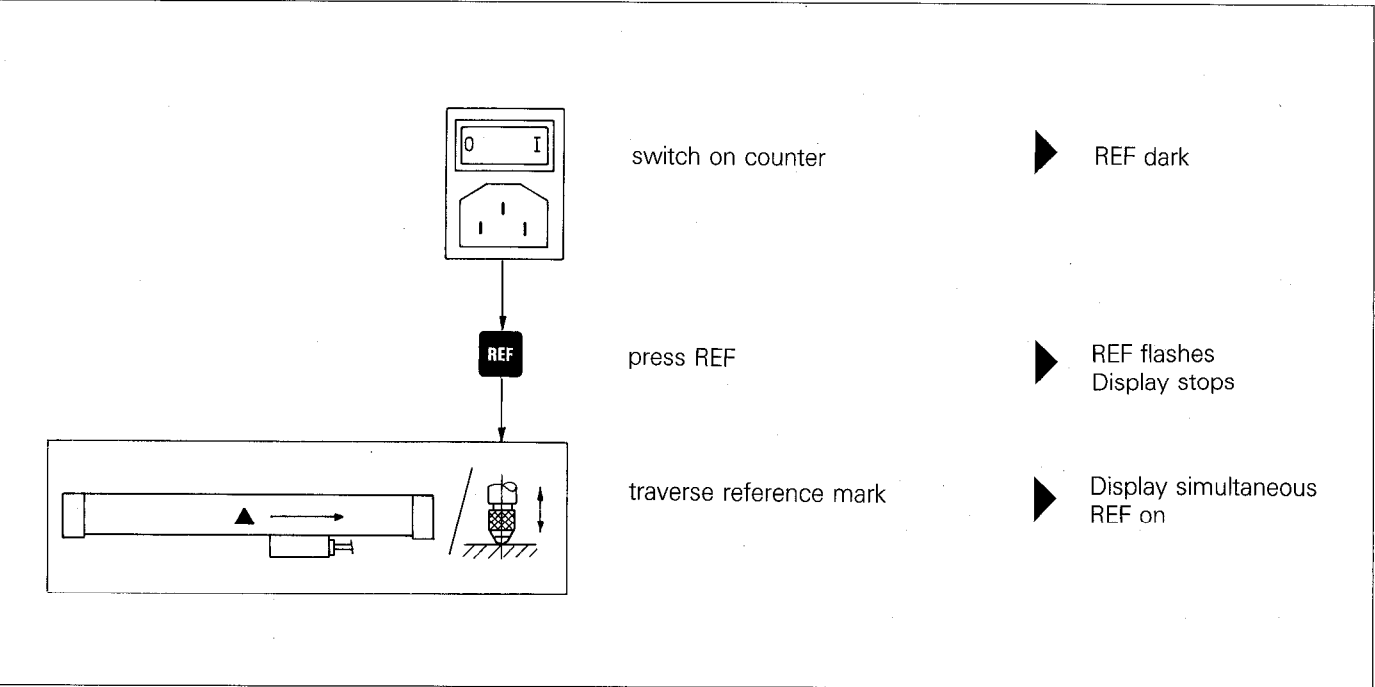
After power interruption the correlation between the position of the machine carriage/plunger and the display value is lost. This correlation can be easily retrieved with the aid of the reference mark evaluation REF by traversing the encoder reference mark. With linear encoders with **distance-coded reference marks** the absolute position value is available after only max. 20 mm travel, i. e. after traversing of two reference marks. In this case the distance between the reference marks is not constant but defined by variation, i. e. the absolute position can be determined by calculation.

7.3.1
Storage of datum point



With activated reference mark evaluation – REF on – all datum value entries are calculated with relation to the reference mark and entered into non-volatile memory.

7.3.2
Retrieval of correlation Plunger position/Display value



Display value is now referenced to the last datum set in REF operation.

7.3.3
Working without reference mark evaluation REF

Some applications provide a fixed mechanical limit stop as reference plane. In these cases the reference mark evaluation is not required. It can easily be disabled by pressing the REF-key **twice** after counter switch-on. The reference system can be retrieved by probing the measuring table surface, a master piece, and zeroing or datum set.

8. V.24/RS-232-C-interface (VRZ 405)

VRZ 405 is provided with a standard interface "V.24" as per CCITT recommendation or RS-232-C as per EIA-Standard. Inputs for the storage command are additionally provided at the same flange socket.

8.1

Definition of V.24-interface (RS-232-C)

The following important criteria are provided because units with different signal levels, connector layouts etc. are on the market as "V.24-compatible systems".

Voltage compatible interface

The V.24-interface (RS-232-C) processes signals with voltage levels. Current interfaces (e. g. 20 mA) cannot be connected!

Signal designations and levels

Signal	Meaning
Data signals: TXD* RXD*	Transmit Data Receive Data
Control signals: DTR RTS	Data Terminal Ready Request to Send
Verification signals: DSR CTS	Data Set Ready Clear to Send

Logic-level	Operating level
"1": - 3 V ... - 15 V	- 5 V ... - 15 V
"0": + 3 V ... + 15 V	+ 5 V ... + 15 V

* Designations "TXD, RXD" are derived through negative level for "1".

Series data transfer

The V.24-interface (RS-232-C) of VRZ 405 transmits data in series. Units with parallel interfaces cannot be connected!

Transfer code

The code being used is ASCII with additional "Even parity bit". This corresponds to the ISO-Code with the following exceptions.
STX: end of data transfer

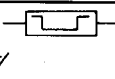
8.2

Layout of V.24-interface (RS-232-C)

Pin	Signal
1	Chassis GND
2	TXD
3	RXD
4	RTS
5	CTS
6	DSR
7	Signal GND
11	0 V for storage (Pin 18 or 25)
18	Storage via pulse control (TTL-level)
20	DTR
25	Storage via contact close

8.3
Storage command

At contacts PIN 18 and PIN 25 the storage commands can be entered via pulse control or contact close for activation of the data output. The corresponding 0 V connection is on PIN 11.

PIN	Function	Level	Duration
PIN 18 PIN 25 PIN 11	Storage via pulse control Storage via contact close 0 V	TTL aktive LOW  aktive LOW 	$\geq 1\ \mu\text{s}$ $\geq 15\ \text{ms}$

Caution: TTL-level is valid for the storage commands:

LOW-level $U_{eL} \leq 0.4\ \text{V}$ at $I_{\text{sink}} - 0.2\ \text{mA}$
HIGH-level $U_{eH} \geq 2.7\ \text{V}$ at $I_{\text{source}}\ 20\ \mu\text{A}$

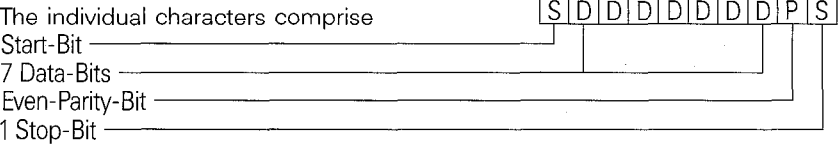
8.4
Transfer rate (baud-rate)

The baud-rate signifies the number of bits which can be transmitted per second. The V.24-interface (RS-232-C) of VRZ 405 permits the following baud-rates: 150, 300, 600, 1200, 2400.
Peripheral units must be able to process the selected baud-rate without limitations in order to prevent data transmission errors.
The baud-rate can be selected via Parameter entry.

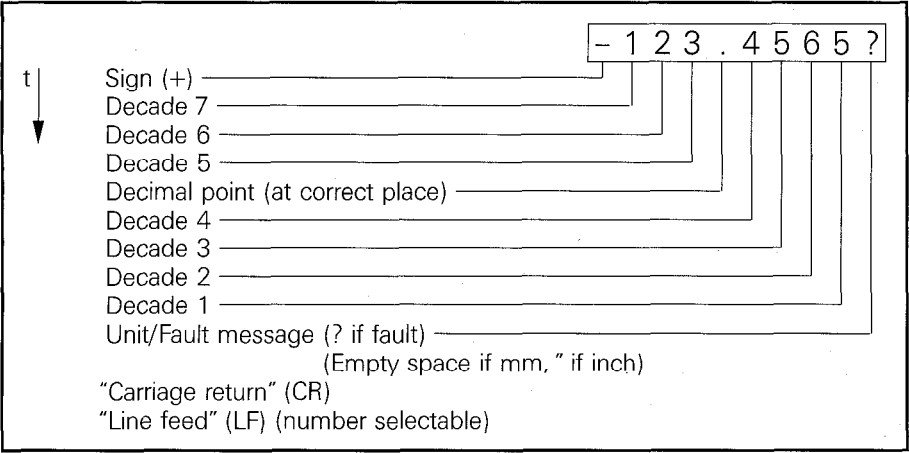
Parameter	Parameter value	Baud-rate
P6	1	150 baud
P6	2	300 baud
P6	3	600 baud
P6	4	1200 baud
P6	5	2400 baud

8.5

Data format



Sequence of character output



The number of additional "line feed" commands (blank lines) is selectable between 0 and 99 via Parameter entry.

Parameter	Parameter value	Description
P0	x	x = number of additional blank lines LF
e. g. P0	1	one additional line feed between 2 printouts (2xLF)
P0	5	five additional line feeds between 2 printouts (6xLF)

8.6

Interruption of data transfer

With normal commercially available data receivers (e. g. printers) it is possible that the data transfer has to be interrupted from time to time (e. g. printing procedure or "overflow" of character memory).
Data output of VRZ 405 can be stopped and restarted via a signal to the interface input CTS.

8.7

Data output

Data output is effected via a built-in intermediate (buffer) memory.
Transfer of the currently displayed value to the intermediate memory is effected by

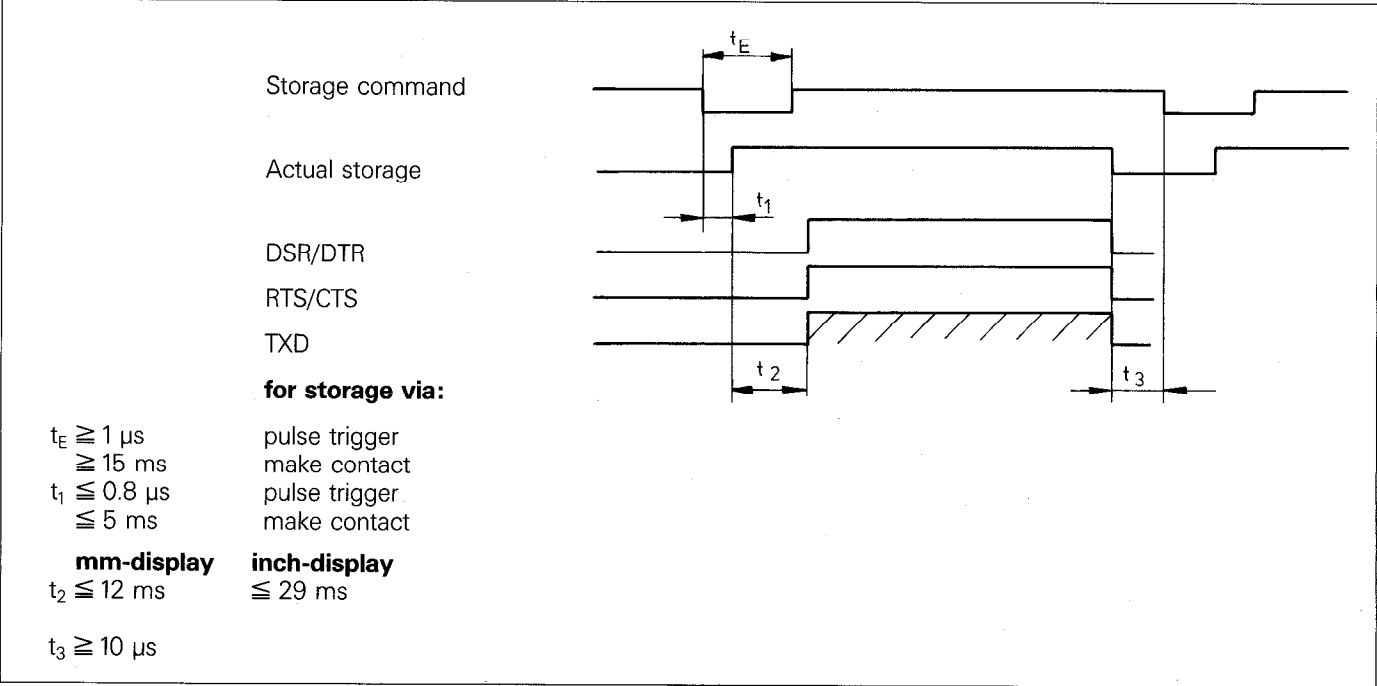
- a) pressing the **PRT**-key
- b) entry of a storage command (contact close or TTL-level)
- c) transmittance of check character Control B (SIX) from data receiver.

After a delay t_2 the data are provided at the interface output TXD. The duration of data transfer is dependent on the selected baud-rate and the required number of line feeds (LF).

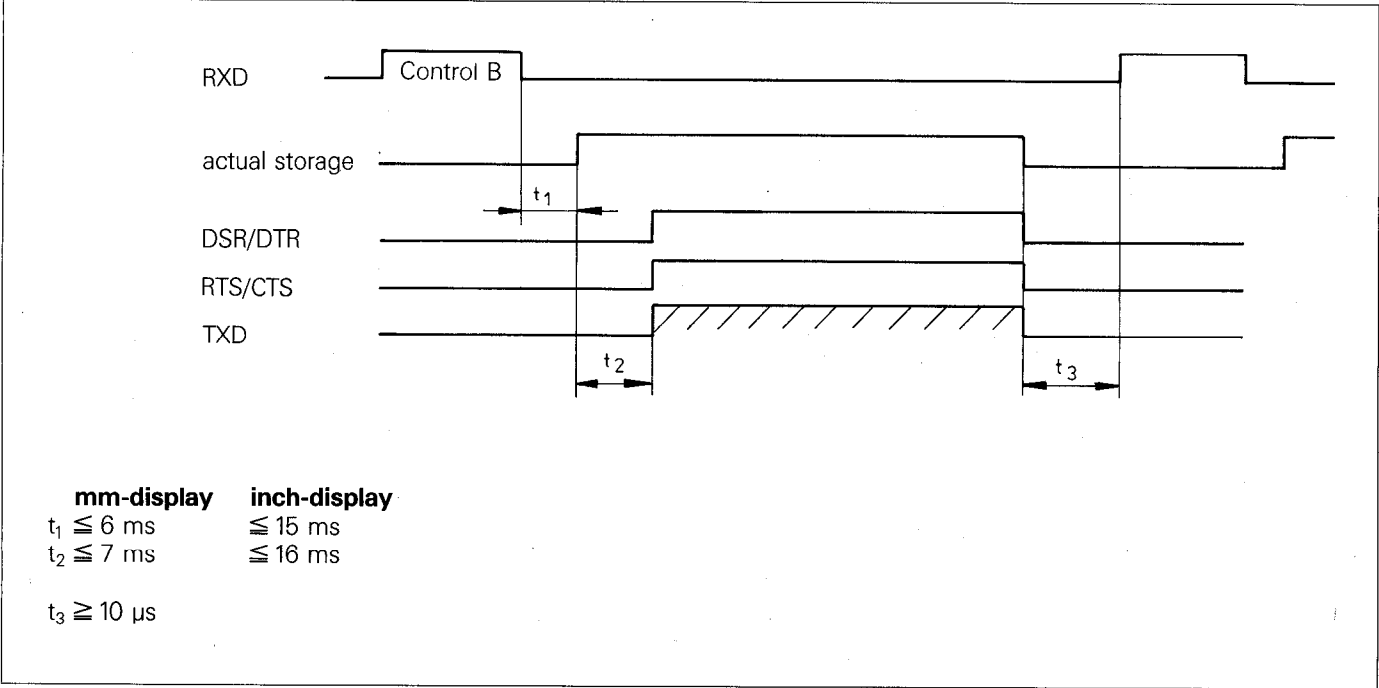
Caution:

For the storage command **TTL-level** is valid, not V.24-level!

Storage via storage command



Storage via check character Control B



8.8

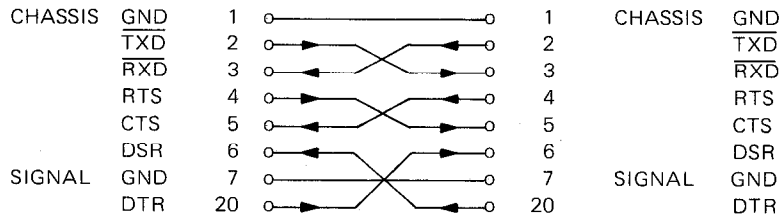
Connection of external units (wiring)

Depending on the make of the employed data units, different wiring of the connection cables might be required. Some non-standard connector layouts are being used.

Commonly used wiring:

Complete wiring

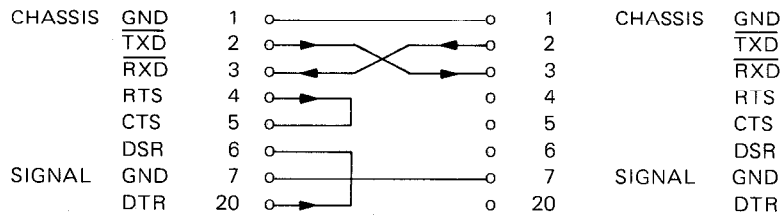
V.24 connection external unit of VRZ 405



Signals RTS, CTS, DSR and DTR must have operating level "1" (+ 5 ... + 15 V) for data transfer.

Simplified wiring

V.24 connection external unit of VRZ 405



Signals RTS, CTS, DSR and DTR constantly have working level "1" (+ 5 ... + 15 V) due to bridges 4/5 and 6/20.

With the simplified wiring an interruption of data transfer via CTS is **not** possible!

8.9

Connecting cable

A shielded connection cable with metal connector housing is to be used to ensure failsafe operation. The shield must be additionally connected to PIN 1 and the connector housing at both sides.

A number of companies which are specializing in interface accessories offer completely wired connection cables.

For this reason the mating connector for the V.24-interface is not included in delivery. It can be ordered separately: connector Sti, 25-pole, Id.-No. 202455 03.

9. Error messages

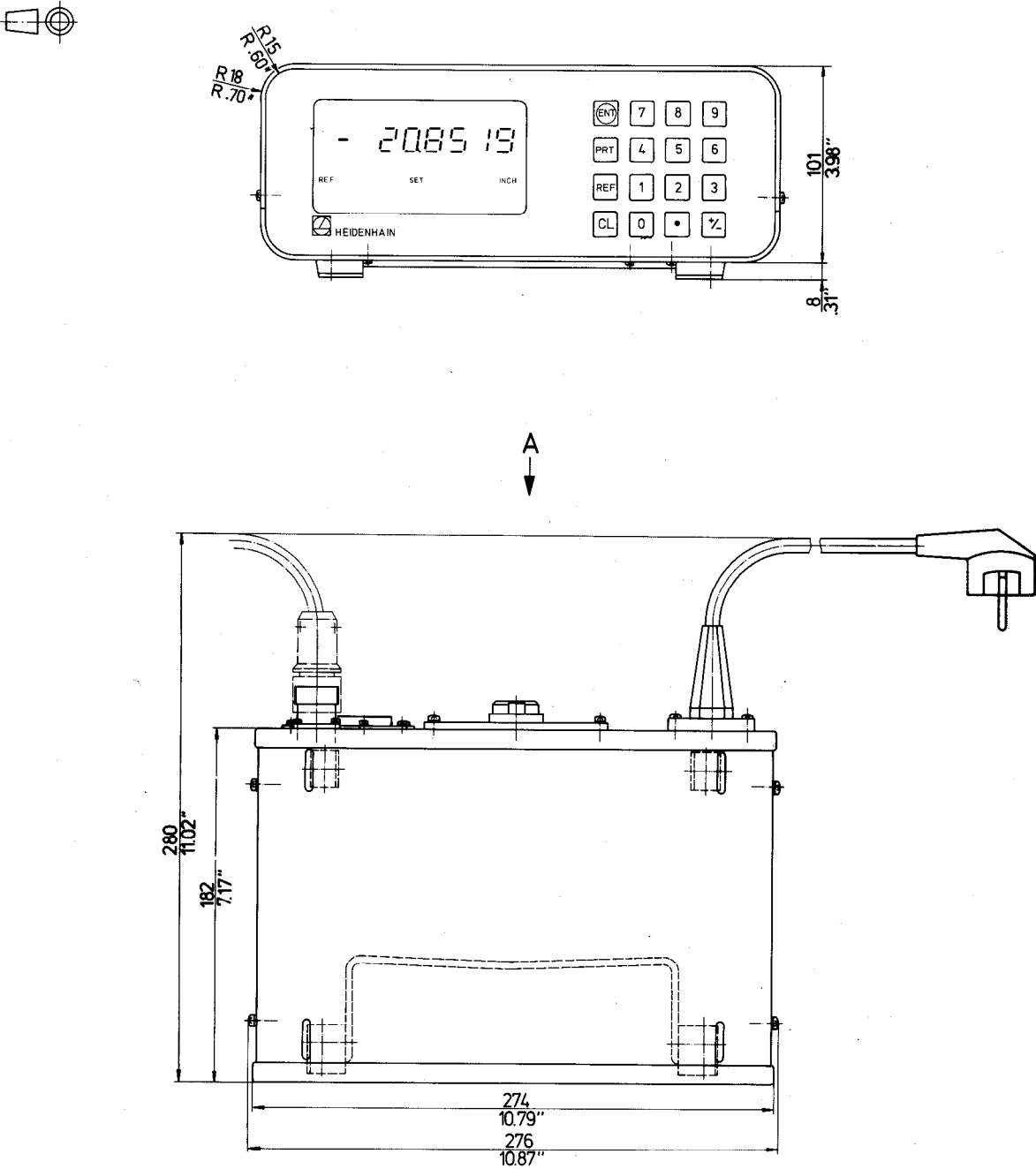
The counter monitors a series of functions. Failures are indicated to the user by means of error messages.

Error message	Trouble shooting	Remedy
Display flashes	a) no measuring system connected	a) connect gauge
	b) break in connection cable	b) check cable and connection
	c) measuring system defective	c) return gauge for repairs
	d) max. permissible measuring velocity (0.25 m/s) exceeded	d) reduce measuring velocity
	e) Mains interruption (also short-time)	
	f) Counter error (only with measuring systems with distance-coded reference marks)	f) Reduce measuring velocity check mounting of measuring system (mounting tolerances!) The error message can be cleared by pressing the REF-key once or twice. The correlation to plunger/ machine slide position and display value must then be retrieved (REF, Zero reset or Datum set, see item 7)
All decimal points illuminated	max. display capacity exceeded mm-display: ± 999.9995 inch-display: ± 99.99998	select datum such that display capacity with full travel is not exceeded.
ERROR 1 (with VRZ 405)	 -key has been activated before the data following first command are output.	error message clear by pressing  .
ERROR 2 (only with VRZ 405)	external unit not ready	connect external unit or check connection; switch external unit on or activate to ready state. Error message cleared by pressing  .

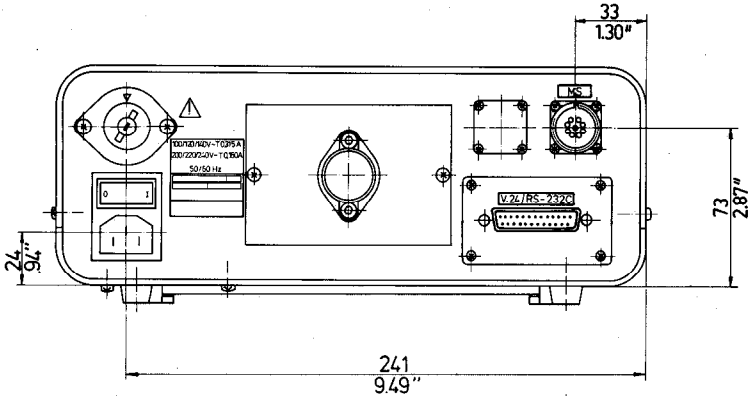
10. Technical specifications

	Housing	desk-top model, for stacking with tilting stand
	Dimensions (w x d x h)	276 x 109 x 182 mm (10.87 x 4.29 x 7.17 in) (without connector)
	Weight	ca. 3.5 kg (7.7 lb)
	Operating temperature	0 ... 45° C (32 ... 113° F)
	Storage temperature	- 30 ... + 70° C (- 22 ... + 158° F)
	permissible rel. humidity	75 % annual average 90 % in rare cases
	Protection	IP 40 (front panel IP 54)
Electrical data	Display	7 decades and sign
	Display step	selectable 0.0005/0.001 mm or 0.00002/0.00005 inch
	Zero reset	· via keyboard
	Datum set	via keyboard
	Reference signal evaluation	· for normal reference marks (REF) · for distance-coded reference mark
	Counting direction	selectable
	mm/inch calculator	standard feature
	Data interface	RS-232-C/V.24 with VRZ 405
	max. measuring velocity	0.25 m/s with grating period 10 µm 0.5 m/s with grating period 20 µm 1 m/s with grating period 40 µm
	Nominal mains voltage (selectable)	100, 120, 140, 200, 220, 240 V
	Mains voltage tolerance	- 15 % ... + 10 %
	Mains frequency	48 ... 62 Hz
	Mains fuse	for VRZ 401 0.125 A slow-blow for 200/220/240 V 0.25 A slow-blow for 100/120/140 V for VRZ 405 0.16 A slow-blow for 200/220/240 V 0.315 A slow-blow for 100/120/140 V
	Power consumption	ca. 10 W

11. Dimensions mm/inch



VIEW A





HEIDENHAIN