europascal
Calibration Experts

nVision
Reference Pressure Recorder

Crystal pressure

- **Discover events (spikes) or trends (leak) in real time**
- **Measure pressure, temperature, current and voltage**
- **Interchangeable, field-replaceable modules**
- **Enclosure is waterproof to IP67**
- **ATEX EX II 1G Certification**
- **Mini USB for powering and downloading data**
- **Log and display 500,000 data points at up to 10 readings/second from 2 sensor modules simultaneously**

By DAkkS according to DIN EN ISO / IEC 17025: 2005 accredited laboratory. The accreditation is valid only for the certificate system D-K-15055-01-00 listed accreditation scope.

DAkkS Deutsche Akkreditierungsstelle D-K-15055-01-00

europascal GmbH
DE-63456 Hanau
Tel.: + 49 (0) 6181 / 42 30 9 0
Fax: + 49 (0) 6181 / 42 30 9 22
service@europascal.de
http://www.europascal.de

Pressure Module

Accuracy

psi (Gauge pressure)

30, 100, and 300 psi modules

0 to 30% of Range:	± (0.0075% of Full Scale)
30 to 110% of Range:	± (0.025% of Reading)
Vacuum:	± (0.06% of Full Scale*)

* Full Scale = -14.5 psi

1000, 3000, 10 000, and 15 000 psi modules

0 to 30% of Range:	± (0.015% of Full Scale)
30 to 110% of Range:	± (0.05% of Reading)

Includes all effects of linearity, hysteresis, repeatability, temperature,and stability for one year.
All models indicate vacuum, *but vacuum specification applies to 30, 100, and 300 psi models only.*
Not recommended for continuous use at high vacuum.
Refer to XP2i-DP data sheet for gauges that are intended for continuous high vacuum use.

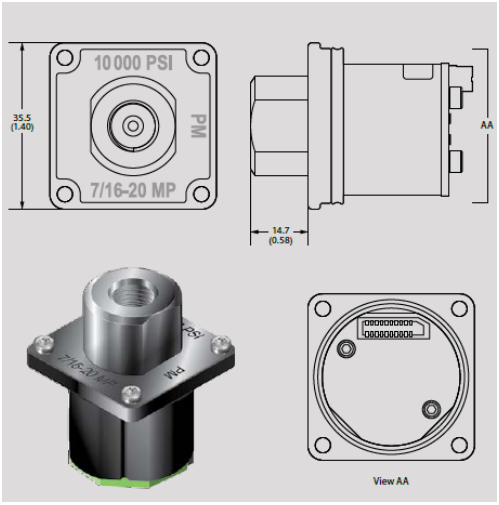
psiA (Pressure with BARO module)

30 psi module

0.200 to 14.500 psiA:	± 0.011 psiA
14.500 to 44.500 psiA:	± (0.025% of Reading) + 0.003 psiA

100 psi module

0.200 to 14.500 psiA:	± 0.011 psiA
14.500 to 44.500 psiA:	± 0.011 psiA
44.500 to 114.500 psiA:	± (0.025% of Reading)



300 psi module

0.20 to 14.50 psiA:	**± 0.01 psiA**
14.50 to 104.50 psiA:	**± 0.03 psiA**
104.50 to 314.50 psiA:	**± (0.025% of Reading)**

1000 psi module

14.5 to 314.5 psiA:	± 0.2 psiA
314.5 to 1014.5 psiA:	± (0.05% of Reading)

3000 psi module

14.5 to 914.5 psiA:	± 0.5 psiA
914.5 to 3014.5 psiA:	± (0.05% of Reading)

10 000 psi module

15 to 3015 psiA:	± 2 psiA
3015 to 10 015 psiA:	± (0.05% of Reading)

15 000 psi module

15 to 4515 psiA:	± 3 psiA
4515 to 15 015 psiA:	± (0.05% of Reading)

europascal GmbH
DE-63456 Hanau
Tel.: + 49 (0) 6181 / 42 30 9 0
Fax: + 49 (0) 6181 / 42 30 9 22
service@europascal.de
http://www.europascal.de

Differential pressure measurement uncertainties with tare

The Tare function can improve measurement uncertainties on two modules with the same full scale pressure range installed into one nVision Reference Recorder. Requires the use of an equalizing valve.

The following specifications apply to the measurement system with a logging interval of 1 second/reading:

Full scale range of both sensors
psi
30
100
300
1000
3000
10000
15000

The greater of (+ / -)					
psi	mbar	inH_2O	mmH_2O		% of DP reading
0.0005	0.04	0.014	0.4	or	0.025%
0.0015	0.10	0.04	1.0	or	0.025%
0.005	0.4	0.14	4.0	or	0.025%
0.02	1.0	0.4	10.0	or	0.05%
0.05	4.0	1.4	n/a	or	0.05%
0.2	10.0	4.0	n/a	or	0.05%
0.3	15.0	6.0	n/a	or	0.05%

Must be enabled in Crystal Control

Differential pressure measurement uncertainties without tare

The total nVision Reference Calibrator measurement uncertainty in the ΔP mode configuration will need to consider the uncertainties of both pressure modules. We recommend the module uncertainties to be combined with the preferred square root of the sum of the squares (or “root sum squares”) method.

The following table lists the possible combinations of using Pressure Modules (PM) with different accuracy statements. The uncertainties reported below are without the use of the Tare feature, which will greatly improve your measurement uncertainty.

		Upper Pressure Module Uncertainties (of Static Line Pressure) (of Reading)	
		0.025%	0.05%
Lower Pressure Module Uncertainties (of Static Line Pressure) (of Reading)	0.025%	0.035%	0.056%
	0.05%	0.056%	0.071%

europascal GmbH
DE-63456 Hanau
Tel.: + 49 (0) 6181 / 42 30 9 0
Fax: + 49 (0) 6181 / 42 30 9 22
service@europascal.de
http://www.europascal.de

Sensor

Wetted Materials:	(wrench tight) 316 stainless steel (finger tight) 316 stainless steel and Viton® (internal o-ring)	*All welded, with a permanently filled diaphragm seal.* *Metal to metal cone seal; O-ring can be removed if necessary.*
Diaphragm Seal Fluid:	Silicone Oil	
Connection:	Crystal CPF* Female	*1/4" medium pressure tube system compatible with HIP LM4 and LF4 Series, Autoclave Engr SF250CX Male and Female Series.* *CPF Adapters to NPT, BSP, and M20 available.*

**U.S. Patent No. 8,794,677*

Barometric Reference (BARO)

Accuracy:	± 0.00725 psi, ± 0.5 mbar
Range:	10.153 to 15.954 psiA, 700.0 to 1100.0 mbarA
Units and Resolution:	psi. . . . . 0.001 inHg. . . . . 0.001 mmHg. . . . . 0.01 mbar. 0.1
Pressure Connection:	Cylindrical sensor fitting of 5.8mm OD. A flexible 4.8 mm [3/16"] ID tube is recommended to connect for for calibration.
Mounting:	Secured using a 3/8" 4-40 plastic screw.

Includes all effects of linearity, hysteresis, repeatability, temperature, and stability for one year.
Exposure to environmental extremes of temperature, shock, and/ or vibration may warrant a more frequent recertification period.
Other units available depending on the installed modules.
Plastic non-conductive screw must be used to comply with hazardous location requirements.

europascal GmbH
DE-63456 Hanau
Tel.: + 49 (0) 6181 / 42 30 9 0
Fax: + 49 (0) 6181 / 42 30 9 22
service@europascal.de
http://www.europascal.de

Current, voltage & switch test module (MA20)

Intended for use with a 4-20mA loop measurement. This module is also capable of measuring supply voltages and has an auxiliary fixed output for use in switch open/closure testing. Each MA20 module includes a super flexible silicone test lead kit (P/N 3952).

Current & voltage measurement

Current (mA) input

Accuracy:	± (0.015% of rdg + 0.002 mA)	*Includes all effects of linearity, hysteresis, repeatability, temperature, and stability for one year.*
Range:	0 to 55 mA (MA20+) 0 to 25 mA (MA20)	For hazardous location product warnings, refer to the operation manual.
Max Allowable Current:	93.3 mA	
Resolution:	0.001 mA or 0.01%	
Units:	mA, % 4-20, % 10-50	*Inputs protected by a resettable fuse. mA can be displayed as a percentage, where 0 to 100% corresponds to either 4 to 20 mA or 10 to 50 mA.*
Input Resistance:	< 17.2 Ω	
Voltage Burden @ 20mA:	< 0.35 V	
Voltage Burden @ 50mA:	< 0.86 V	
HART Resistance:	250 Ω	
Connection:	2mm jacks	*Jacks are compatible with safety sheathed banana plugs.*

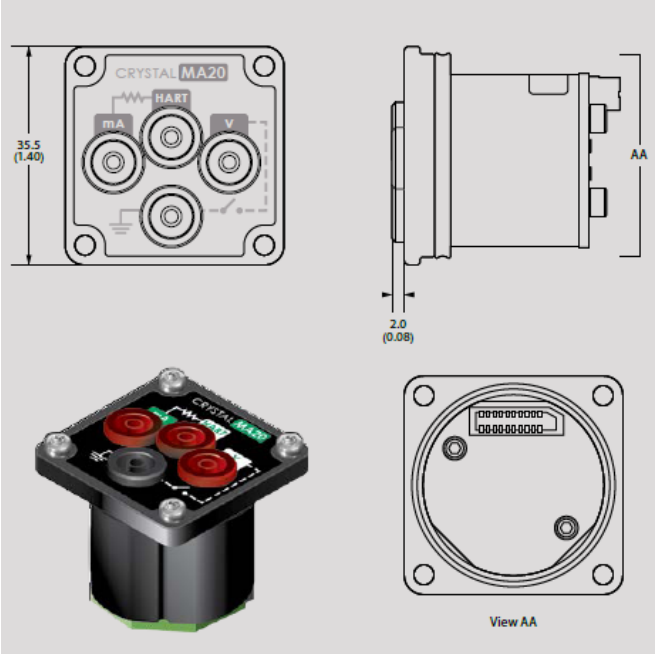
Voltage (VDC) Input

Accuracy:	± (0.015 % of rdg + 0.002 VDC)	*Includes all effects of linearity, hysteresis, repeatability, temperature, and stability for one year.*
Range:	0 to 28 VDC	
Max Allowable Voltage:	30 VDC	
Resolution:	0.001 VDC	
Units:	VDC	

Switch Test

Switch Type	Dry contact	*Switch state change indicated by bright green LED flash.*
Closed State Resistance:	< 10 Ω	
Open State Resistance:	> 10 MΩ	*Switch test screen reports switch open, close, and deadband values.*

europascal GmbH
DE-63456 Hanau
Tel.: + 49 (0) 6181 / 42 30 9 0
Fax: + 49 (0) 6181 / 42 30 9 22
service@europascal.de
http://www.europascal.de



ATEX and IECEx Scheme Entity Parameters

The MA20 Module has these specific input entity parameters:

Ui = 28 V Uo = 6.6 V
Ii = 93.3 mA Io = 4.45 mA
Pi = 653.3 mW Po = 7.34 mW
Ci = 0.36 uF Co = 0.5 uF*
Li = 39.1 uH Lo = 12 uH**

* Dependent on the supply to the terminals but shall not be greater than 0.5 uF
** Total cable inductance between all modules

Temperature Module (RTD100)

Calibrated for Pt100 RTD / PRT (100 Ohms at 0°C Platinum Resistance Temperature Detector) sensors conforming to DIN/ IEC 60751 (or IEC751) with US, Euro, or Lab calibration curves. An RTD is not included, but each RTD100 includes P/N 3953 RTD Connection Kit.

Temperature Measurement

Resistance input

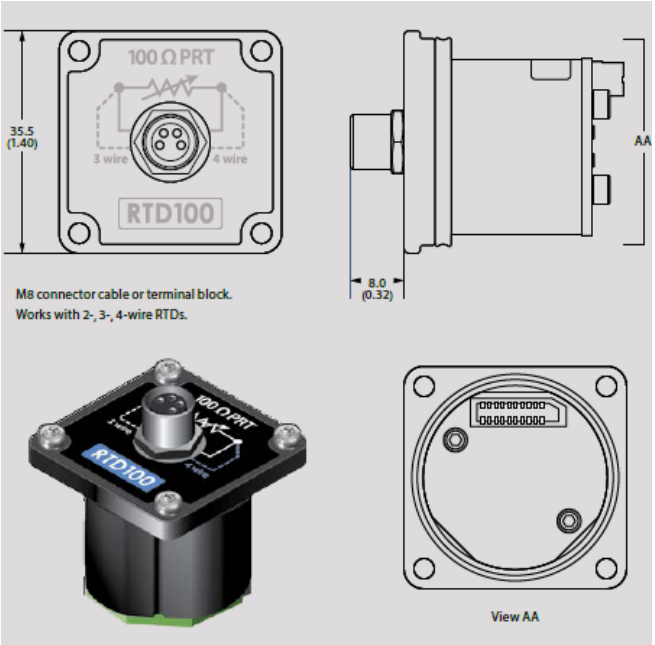
Accuracy:	± (0.015% of rdg + 0.02 Ω)
Range:	0 – 400 Ohms range for use with 100 Ohm PRTs
Resolution:	0.01 on all scales
Units:	°C, K, °F, R, Ω
TCRs	0.003850 Ω/Ω/°C (IEC 60751), 0.003911 Ω/Ω/°C (US Industrial Std), 0.003926 Ω/Ω/°C
Wiring:	2-, 3-, 4-wire support
Connection:	M8 connector cable or terminal block

Includes all effects of linearity, hysteresis, repeatability, temperature, and stability for one year.

The proper selection of the RTD sensing element is very important as the error associated with this device is the majority of the overall system measurement uncertainty. IEC 751 is the standard that defines the temperature versus resistance for 100Ω, 0.00385 Ω/Ω/°C platinum RTDs. IEC 751 defines two classes of RTDs: Class A and B. Class A RTDs operate over the -200 to 630°C range versus -200 to 800°C for the Class B elements. For example, the Class A uncertainty is about half that of the Class B elements as illustrated in the following table.

europascal GmbH
DE-63456 Hanau
Tel.: + 49 (0) 6181 / 42 30 9 0
Fax: + 49 (0) 6181 / 42 30 9 22
service@europascal.de
http://www.europascal.de

Temperature (°C)	nVision uncertainty		Class A uncertainty		Class A nVision + Class A uncertainty		Class B uncertainty		Class B nVision + Class B uncertainty	
	±Ω	±°C	±Ω	±°C	±Ω	±°C	±Ω	±°C	±Ω	±°C
-200	0.02	0.05	0.24	0.55	0.24	0.55	0.56	1.30	0.56	1.30
0	0.04	0.09	0.06	0.15	0.07	0.17	0.12	0.30	0.12	0.31
200	0.05	0.13	0.2	0.55	0.21	0.56	0.48	1.30	0.48	1.31
400	0.06	0.17	0.33	0.95	0.33	0.96	0.79	2.30	0.79	2.31
600	0.07	0.21	0.43	1.35	0.44	1.37	1.06	3.30	1.06	3.31
800	0.08	0.25	0.52	1.75	0.53	1.77	1.28	4.30	1.28	4.31



ATEX and IECEx Scheme Entity Parameters

The RTD100 Module has these specific input entity parameters:

Ui = 0 V Uo = 9.73 V
Ii = 0 A Io = 1.6642 A
Pi = 0 W Po = 1.1 W
Co = 0.5 uF
Lo = 12 uH*

* Total cable inductance between all modules

Specifications

Operating temperature
Temperature Range: -20 to 50° C (-4 to 122° F)

< 95% RH, non-condensing. No change in accuracy over operating temperature range. Gauge must be zeroed to achieve rated specification. Applies to all modules.

Display
Screen: 255 x 160 pixel graphical display
Display Rate: 4 readings/second (standard)
up to 10 readings/second (recording)

LCD readable in sunlight with bright backlight.

Power
The nVision is Intrinsically Safe only if powered by one of the following battery types.

ATEX/IECEx:

Approved battery type	Ta=	Marking
Rayovac Max Plus 815	-20 to 50° C	Ex ia IIB T4 Ga
Duracell MN1500	-20 to 45° C	
Energizer E91, EN91	-20 to 50° C	Ex ia IIB T3 Ga
Duracell MN1500		

europascal GmbH
DE-63456 Hanau
Tel.: + 49 (0) 6181 / 42 30 9 0
Fax: + 49 (0) 6181 / 42 30 9 22
service@europascal.de
http://www.europascal.de

CSA:

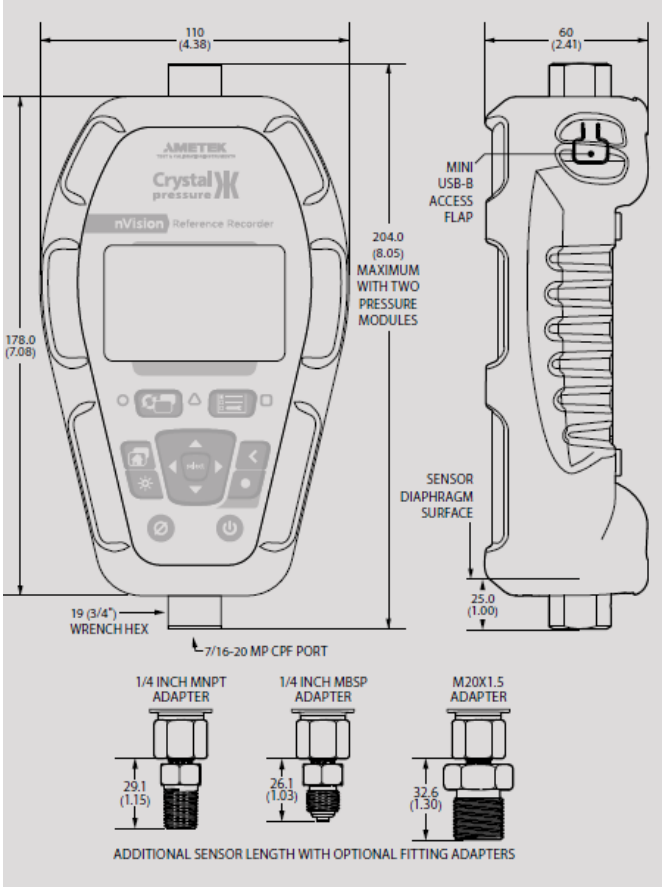
Approved battery type	Ta=	Marking
Rayovac Max Plus 815	-20 to 50° C	Class I, Division 1, Grp C, D T4
Duracell MN1500	-20 to 45° C	
Energizer E91	-20 to 50° C	Class I, Division 1, Grp C, D T3B
Energizer EN91		Class I, Division 1, Grp C, D T3A
Duracell MN1500		Class I, Division 1, Grp C, D T3C

4 x AA: 200 hours, typical
Ultra Low Power: Up to 60 days, typical*

**2 installed modules, 1 reading per 5 minute recording interval, and 23° C ambient temperature.*

Uses 4 alkaline AA (LR6) batteries. Use of backlight reduces operating time.

For hazardous location product warnings, refer to the operation manual.



Data/ communication
Digital interface: Mini USB

The mini USB will power the nVision with or without the battery pack installed.

For hazardous location product warnings, refer to the operation manual.

europascal GmbH
DE-63456 Hanau
Tel.: + 49 (0) 6181 / 42 30 9 0
Fax: + 49 (0) 6181 / 42 30 9 22
service@europascal.de
http://www.europascal.de

Datalogging

Capacity:	Approx. 1,000,000 data points*
Storage Type:	Non-volatile flash memory
Fastest Interval:	10 per second
Slowest Interval:	1 per hour

**Single Module Recording*

Limit of 64 individual recordings.

The included CrystalControl software is compatible with Vista (SP 2), Windows 7 (SP 1), Windows 8.1 and Windows 10.

Produces csv, xls, pdf, or signed pdf files, and uses Excel template files (samples included) to automatically format and graph data.

Enclosure

Weight:	680 g (24.0 oz)
Rating:	IP67
Housing:	Impact resistant injection molded
Keypad and labels:	UV Resistant Polyester
Mounting:	M4 x 0.7 [8 mm (0.31")] deep threaded insert mounting locations

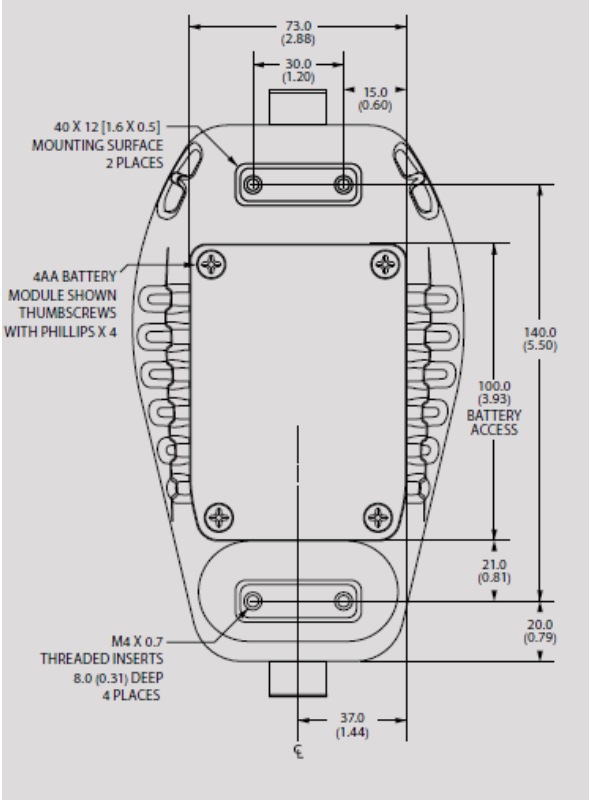
Weight includes one pressure module, one RTD module, 4AA battery module, and protective boot.

Submersible to 1 m for 30 minutes [IEC 60529].

LCD protected from impact damage by 1.5 mm (0.06") thick polycarbonate lens.

Skydrol® compatible.

For hazardous location product warnings, refer to the operation manual.



europascal GmbH
DE-63456 Hanau
Tel.: + 49 (0) 6181 / 42 30 9 0
Fax: + 49 (0) 6181 / 42 30 9 22
service@europascal.de
http://www.europascal.de

Storage temperature
Temperature Range: -40 to 75° C (-40 to 167° F)

Batteries should be removed if stored for more than one month.

Special features
The following requires the use of our free **CrystalControl** software
Averaging Screen: Averages all points in a recording run.
Data Point Counter: Screen for counting the data points logged.
Display Screens: Turn on and rearrange display screens.
Estimated Recording Time: A CrystalControl calculation based on active screens and logging interval.
Live PC Graph: During a recording, graph directly to your PC.
Password Protect: Changes to configuration or userspan calibration factor(s).
Pressure Switch Test: Using a PM and MA20, get deadband and state-change pressure.
Remove: Unwanted pressure units.
Run Tags: Create and enable run tags that will identify logging runs.
Screen Numbers: Number each display screen to make writing procedures around the nVision easier.
Secure Documents: Download into secure pdf documents for tamper proof records.
Start-up Screen: Define a 32-character prompt which requires user acknowledgement at startup.
User Defined Unit: Define and display any pressure units not included, or to use the gauge to display force, level or other pressure related parameters.

Certifications

ATEX II 1G Ex ia IIB T4 Ga or T3
SIRA 09 ATEX 2008X
This product conforms to: EN 60079-0: 2006 | EN 60079-11: 2007 | EN 60079-26: 2007

IECEx Ex ia IIB T4 Ga or T3
IECEx SIR 09.0053X
This product conforms to: IEC 60079-0: 2004 | IEC 60079-11: 2006 | IEC 60079-26: 2006

Exia Intrinsically Safe and Non-incendive for Hazardous Locations: Class I, Division 1, Groups C and D, Temperature Code T4 / T3A/ TCB / T3C. For hazardous location product warnings, refer to the operation manual.

nVision complies with the Electromagnetic Compatibility and the Pressure Equipment Directives.

nVision is approved for use as a portable test instrument for Marine use and complies with Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Offshore Standards.

europascal GmbH
DE-63456 Hanau
Tel.: + 49 (0) 6181 / 42 30 9 0
Fax: + 49 (0) 6181 / 42 30 9 22
service@europascal.de
http://www.europascal.de

Range & resolution table

Display resolution

PM	Range (psi)	Over pressure	psi	inH_2O	inHg	mmHg	mmH_2O	kg/cm^2	bar	mbar	kPa	MPa
30PSI	30	3.0 x	0.001	0.01	0.001	0.01	1	0.0001	0.0001	0.1	0.01	
100PSI	100	2.0 x	0.001	0.1	0.01	0.1	1	0.0001	0.0001	0.1	0.01	0.00001
300PSI	300	2.0 x	0.01	0.1	0.01	0.1		0.001	0.001	1	0.1	0.0001
1KPSI	1000	2.0 x	0.1		0.1			0.001	0.001		0.1	0.0001
3KPSI	3000	1.5 x	0.1		0.1			0.01	0.01		1	0.001
10KPSI	10 000	1.5 x	1					0.01	0.01		1	0.001
15KPSI	15 000	1.3 x	1					0.01	0.01		1	0.001

(Add one digit of resolution for differential mode.)

CPF fitting knits

NPT Kit… -N (4013)
Includes MPF-1/8QTF, MPF-1/4QTF, and MPF-1/2QTF.

BSP Kit… -B (4015)
Includes MPF-1/8BSPF, MPF-1/4BSPF, MPF-3/8BSPF and MPF-1/2BSPF.

Standard delivery

- nVision Recorder
- CD Manual
- ISO 17025 Accredited Calibration Certificate, NIST Traceable
- Soft Carrying Case P/N 4087
- Protective Boot P/N 3985
- Mini-USB Cable P/N 3951

Accessories

BARO Calibration Kit P/N 4547
Magnetic Hanging Strap P/N 5177
24 Volt Loop Power Supply P/N 24VDCPS
Waterproof Carrying Case P/N 2888
RTD Terminal Block P/N 3953 (included with RTD100 module)
Test Lead Kit P/N 3952 (included with MA20 Module)

Accessories

Crystal Engineering offers a wide range of products that work with the nVision:

- Fittings that connect without tools, safely and without leaks
- Lightweight, super flexible high pressure hoses
- Fitting kits and adapters
- Pneumatic hand pumps
- Hydraulic hand pumps
- Portable pressure comparators
- Software, for the quickest way to calibrate pressure transmitters and gauges

europascal GmbH
DE-63456 Hanau
Tel.: + 49 (0) 6181 / 42 30 9 0
Fax: + 49 (0) 6181 / 42 30 9 22
service@europascal.de
http://www.europascal.de

Pump systems

All pump systems for the nVision include 1/4 NPT and BSP female fittings for the device under test, plus a carrying case with custom insert. For complete details, click on the systems below.

Systems A… AXX (T-960), AHX (T-970)
Systems B… BXX (T-965), BHX (T-975-CPF)

Systems F… FOV and FWV (T-1-CPF)

Systems D… DOX and DWX (P-018-CPF)

System H… HOX (T-975-CPF and T-620H-CPF)

System E… EOX (P014)

Systems G … GOX and GWX (GaugeCalHP)

Systems C… CXX (T-620),
CHX (T-620H-CPF)

europascal GmbH
DE-63456 Hanau
Tel.: + 49 (0) 6181 / 42 30 9 0
Fax: + 49 (0) 6181 / 42 30 9 22
service@europascal.de
http://www.europascal.de