Machine Condition Monitoring System

Data Collector **VA-11C**

with Analysis software **ProCon11C**

Easy and Precise Equipment Diagnostics
Simply Follow the Route List Display to perform on-site measurement

- Data collector function for gathering measurement data at multiple diagnosis points along a predetermined route
- PC-based condition monitoring software allows easy creation and maintenance of an equipment data base
- Up to 500 measurement points can be included in a route list
- The condition monitoring software offers easy and intuitive route management with multiple functions and runs under Microsft Windows
- A dedicated memory card is used to exchange route table and measurement data between the VA-11C and PC

Dedicated analysis software ProCon11C that runs under Windows 95/98 and Windows NT 4.0 is available.

The data collector function built into the VA-11C is simple and straightforward. Measurements are performed according to preset parameters, making the task of the operator very easy. With ProCon11C software for data management, analysis of measurement the route data created in a PC are stored on a memory card which is then used to load the data into the VA-11C.

ProCon11C organizes measured equipment in a hierarchical structure and creates and stores route tables. Graphic display and printouts of measurement data.

Because the VA-11C comprises the vibration analysis function, on-site vibration analysis is also possible.

Vibration Analysis Mode Simultaneously Shows Acceleration, Velocity, and Displacement

- Latest electronics technology makes fully digital processing of measurement results possible. Effective and peak acceleration, crest factor, velocity, and displacement are obtained simultaneously, no need for making selections during measurement.
- 16-bit D/A converter achieves 80 dB dynamic range. This allows reading even small values on the spectrum display without having to switch range settings.
- Built-in backlight makes the display easy to read even in dark locations.
- Spectrum display shows the overall value. Up to 500 spectra patterns can be stored, and 800-line resolution allows zoom up to x8.
- List display of highest ten levels is useful for diagnostic purposes.
- Time waveform information can be stored for later re-analysis of data.
- Data stored on a memory card can be transferred to PC and read into spreadsheet software for further processing.
- These versatile features and functions assure superb ease of use and contribute significantly to efficient diagnostics and machine maintenance.
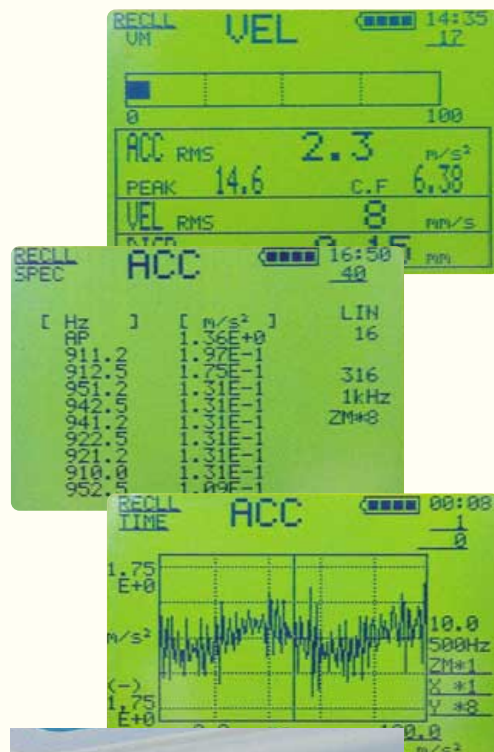
ProCon11C® (Licensed by NAIDEN TEKNIK AB, Sweden)

Analysis software for user friendly and reliable condition monitoring

ProCon11C is Naiden's monitoring and analysis software for data management and analysis of measurement data for condition monitoring internationally acknowledged for its versatility and user friendliness.

ProCon11C was developed specifically to serve the VA-11C data collector for periodic condition monitoring.

The 32-bit software works under Windows 95/98 as well as NT4.0. Operator interface is predominantly based on graphical communication. Operator input like mechanical machine characteristics is also set up graphically and are obtained automatically. The system has very powerful tools for machine diagnostics.
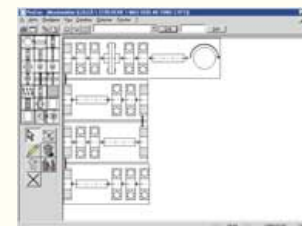
Machine data

Expert guide
The operator is guided to feed machine data and information about how the machine is built up into the system, data such as type of driving, transmission and rotating speed. ProCon11C automatically defines frequency band, resolution, and machine diagnosis as well as disturbance frequencies.

Machine database
The transmission line is documented in the database and visualised in an easy to read drawings. All the disturbance frequencies of the sub-components are thus obtained automatically in the database. This makes it very easy to identify damaged components, independent of where the measuring point is positioned on the machine.

Machine screen
The location of a measurement point is illustrated in a computer-generated image or on a digital photograph of the machine. Lightened yellow or red measurement points indicate warning and alarm respectively.
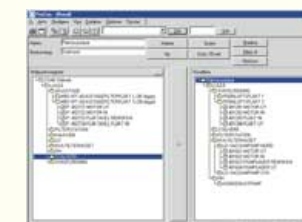
Tree structure
Through simple mouse clicks you will find your way through the tree structure to the desired measurement point. Alarm indications and machine measurement points where readings are overdue are indicated automatically.
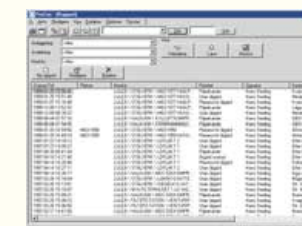
Presentation

Route list management
The route list function has a tree structure where measurement points are displayed and indicated whether they are measured or not. This information is subsequently downloaded into the VA-11C datacollector.
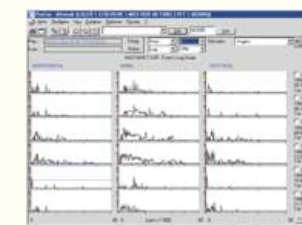
Report generator
The report generator is used to document the out-come of conducted condition monitoring. The report may directly be linked to an existing administrative maintenance system in order to create condition controlled work orders.
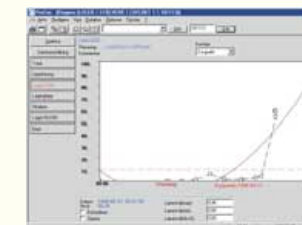
Analysis

Historical analysis
All readings from measurement points are saved and may be individually compared and differences between various readings may be studied. Displays of various selected reference spectra may be fixed and automatically compared with historical measurements.

Diagnostics
ProCon11C automatically performs frequency analysis and indicates the type of machine fault, 10 different types of machine faults may be allocated to each measurement point. Alarm levels are automatically set by ProCon11C individually for each machine. This level may be adjusted manually if required.

Memory Card (PCMCIA) for data storage and easy data exchange to PC

ProCon11C - FOR ANALYSIS AND PROBLEMSOLVING

MACHINE TYPE
Electric motors
Generators
Gearboxes
Fans
Turbines (gas, steam, hydroelectric etc.)
Pumps
Refiners
Mixers
Reciprocating engines
Screw compressors
Machine-tools
Separators
Turbo compressors
CNC machines

MACHINE FAULTS
Imbalance
Bearing damage
Bent shafts
Alignment faults
Gearwheel damage
Resonance problems
Defective electric motors
Mounting problems
Defective belt operation
Cavitation
Turbulence
Foundation problems

ANALYSIS METHODS
FFT analysis
Enveloping
Diagnostics
Alarm
Statistics
Expert system
Machine database
Machine screen
Historical analysis
Round list
Event list
Report generator

TECHNICAL SPECIFICATIONS ProCon11C®

Operating system
ProCon11C is compatible with 32 bits Windows 95/98/NT.

Data base
ProCon11C is adapted to an open data base structure (Microsoft Access) and Client/Server.

Analysis
Enveloping. Trends. Diagnostics. Alarm.
Expert system.

YEAR 2000 COMPLIANT

CE

System requirements

The following is the minimum standard for work stations for ProCon11C

- IBM-compatible PC, minimum configuration of Pentium 166MHz processor, 64MB RAM (primary memory).
- PCMCIA socket.
- Microsoft Windows 95/98/NT4.0.
- Mouse, track-ball, digital board or similar.
- Minimum 15 inch screen with a resolution of 800 × 600 pixels.

Specifications for VA-11C

Input section

Input connector:	Standard accelerometer: PV-57
Vibration measurement quantities:	Acceleration, acceleration envelope, velocity, displacement (Acceleration envelope in analyzer mode only)

Input range (with PV-57)

Acceleration:	1, 3.16, 10, 31.6, 100, 316 m/s² (rms)
Velocity:	3.16, 10, 31.6, 100, 316, 1000 mm/s (rms)
Displacement:	0.089, 0.283, 0.894, 2.83, 8.94, 28.3 mm ($E_{Q P-P}$)
High-pass filter:	3 Hz, 10 Hz, 1 kHz (-10% point)
Low-pass filter:	1 kHz, 5 kHz, 20 kHz (-10% point)

Vibration meter mode
Simultaneous processing of following items (digital)

Acceleration:	rms, peak, crest factor
Velocity:	rms
Displacement:	Equivalent P-P value ($E_{Q P-P}$)

Analyzer mode

A/D converter:	16 bit, delta sigma principle, 51.2 kHz sampling
Processing items:	Waveform, spectrum
Frequency span:	100, 200, 500, 1k, 2k, 5k, 10k 20k Hz
Resolution:	100, 200, 400, 800 lines

Average processing

Spectrum:	Instantaneous value, exponential averaging, linear averaging, peak hold
Waveform:	Instantaneous value
Trigger source:	External signal, input level

Display section

Display

LCD dot resolution:	192 × 128
Display size:	77.5 × 54 mm
Backlight:	EL backlight

Display data

Vibration meter display:	Acceleration, velocity, displacement Bar graph and numeric indication
Spectrum display:	Graph, list
Waveform display:	Graph only, 128 data

Memory

Data memory	
Manual store:	Measurement parameters and analysis results are stored in specified address
Transient store:	Continuous store of waveform
Timer store function:	Start time, repeat interval, number of store data can be specified for storing data in data memory
Re-analyze function:	Data stored in transient memory can be re-analyzed.
Measurement settings memory:	10 sets
PCMCIA card:	ATA type compact flash card

Inputs/outputs
RS-232C interface

Function:	Control of VA-11C from computer Transfer of measurement data to computer
Printer output	
Compatible printers:	CP-10, CP-11, DPU-414
External trigger input:	TTL level falling edge

Others

Dimensions:	Approx. 17.4 × 15.6 × 4.6 cm
Weight:	Approx. 770 g (including battery)
Power supply	
System batteries:	Four IEC R14 (size C) batteries
Ambient conditions for use	
Temperature:	0 - +40°C
Humidity:	20 - 90%

Supplied accessories:		
	Accelerometer (PV-57) with cable	1
	Magnet attachement	1
	M6 screw	1
	4MB Compact flash card for VA-11C with card adapter	1
	Soft carrying case	1
	Shoulder belt	1
	IEC R14 (Size C) batteries	4
	Lithium battery (CR-1/3N)	1
	Instruction manual	1
	Serial interface manual	1
Optional accessories:	Hard case (CF-21)	
	AC adapter (NC-94)	

• Specifications subject to change without notice. • Windows is a registered trademark of Microsoft Corporation. • ProCon11C is a registered trademark of NAIDEN TEKNIK AB.

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