

Employer
SAKO BRNO A.S.

Project
Modernization of WtE Plant SAKO Brno

Date
July 2024

PART III, APPENDIX E9

SPECIFICATIONS FOR EMPLOYER'S EXISTING CEMS



PART III, APPENDIX E9 SPECIFICATIONS FOR EMPLOYER'S EXISTING CEMS

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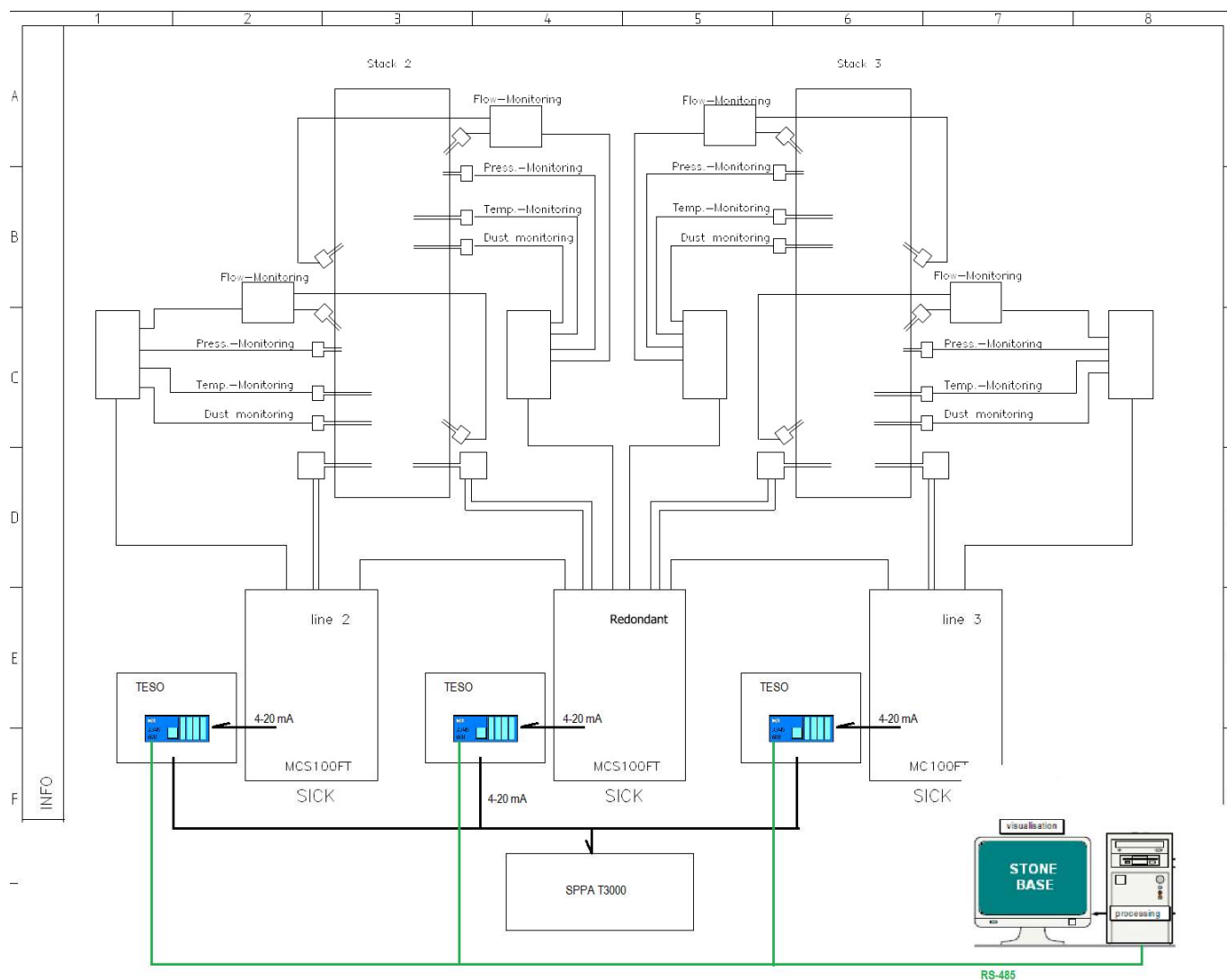
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1. INTRODUCTION

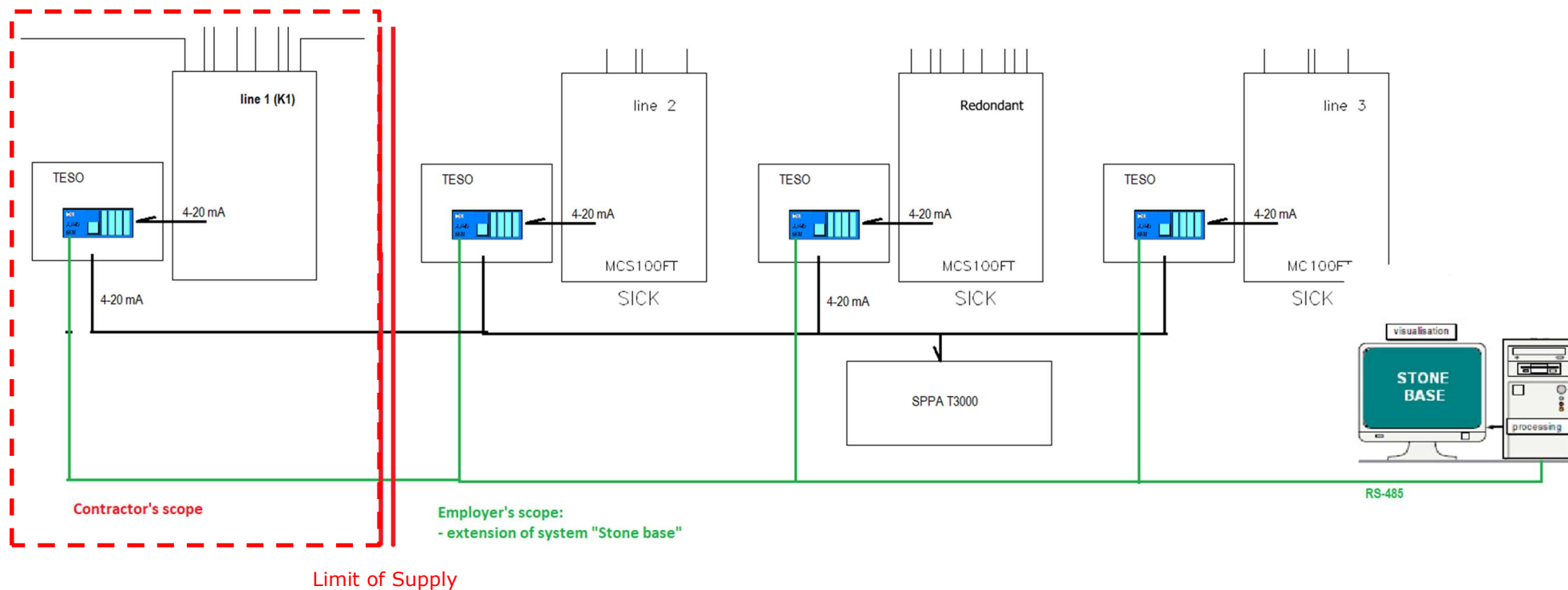
This appendix provides the topology diagram and specifications for the Employer's existing Continuous Emission Monitoring Systems (CEMS) of EfW Line K2 and K3. In addition, it covers the limit of supply for the CEMS of the Line towards the existing CEMS.

2. TOPOLOGY DIAGRAM FOR EXISTING CEMS



3. SUPPLY LIMIT OF CEMS FOR THE LINE

The figure below illustrates the limit of supply for the CEMS of the Plant.



4. SPECIFICATIONS FOR SCADA SYSTEM STONEBASE

SCADA SYSTEM StoneBase

PC Software
for the graphic display
And statistic procesing



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Release date (1.0): 29. January 2010



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1. SYSTEM DESCRIPTION

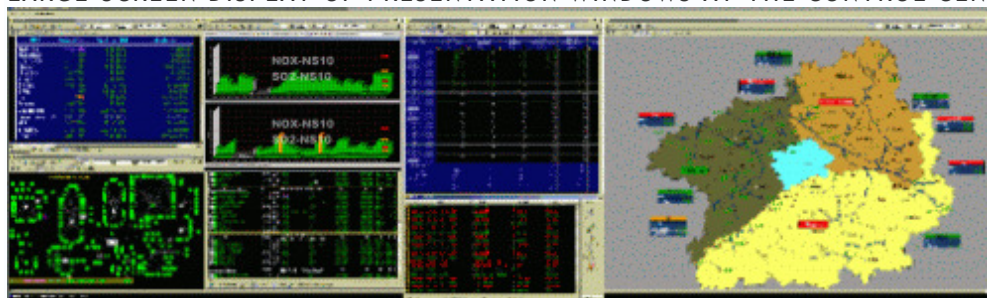
SCADA system StoneBase



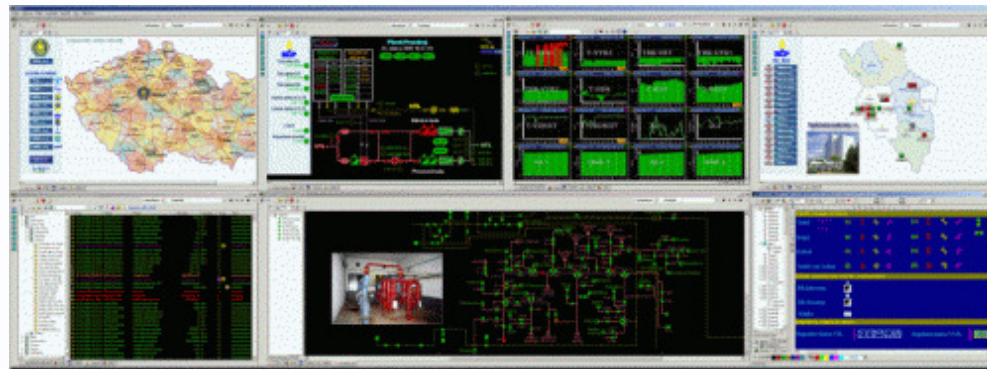
The StoneBase has all characteristics of modern SCADA system designed for monitoring and controlling of industrial processes. It also includes all necessary functions for continuous emissions monitoring systems and warning systems. The StoneBase is easy scalable from a local monitoring of several measuring points on a single computer to a wide network of programmable logic controllers providing the real-time data acquisition of thousands of parameters. The longtime experience in the field of SCADA systems and continual contact with our customers help us in creating special solutions that can be adapted to the changing needs. As a part of our delivery we propose the optimal configuration and recommend necessary computing, communication and display equipment. We supply both complete installation and data model creation.

The StoneBase system is distributed application dedicated for MS Windows environment. It consists of many client/server components sharing information in the common data warehouse based on SQL. Central database contains not only measured and processed values (current data, historical records, alarm events), but also the complete set of parameters and other information used for presentation (vector images, bitmaps, scripting codes, sounds). Specialized engine for unified access to the date warehouse supports many types of SQL systems (MySQL, MSSQL, Pervasive SQL). The StoneBase system is now distributed in version 8.

LARGE-SCREEN DISPLAY OF PRESENTATION WINDOWS AT THE CONTROL CENTER FIG.1:



LARGE-SCREEN DISPLAY OF PRESENTATION WINDOWS AT THE CONTROL CENTER FIG.2:





The server components perform data acquisition, evaluation, further processing and archivation. They also distribute commands to PLC's, generate alarm events and periodically run backup. All components utilize the native TCP/IP communication and can be distributed on more hosts in case of increased load. Failover cluster configuration is recommended where high availability is required. All server components are controlled and monitored by supervisory application running as service.



The most important part of the client side of StoneBase is data presentation. With the client components user can also setup parameters, design data model and control non-visual server components. Client application can run on any LAN node and with the help of StoneBase service net on any PC connected to Internet. Some components are web applications and for others a special PDA version is available.



StoneBase Explorer is the main client component designed for continuous monitoring, controlling and alarm handling. It is a powerful tool for detailed analyzing and presentation of technological data. The Explorer shows real-time data as well as historical trends and numerous statistics. Data from the warehouse are presented in the form of complex lists, charts and tables. The same data can be displayed in the set of graphic schemas with animated elements and context links. The layout of schema can be created by built-in vector editor, scripts in BASIC are used for animation. Special function, e.g. prevailing wind direction chart are available. The presentation can be spanned over a great number of windows and is very suitable for multi monitor configuration.

1.1 INTENDED USE

STONE BASE is an emissions data evaluation system for

- Evaluating emission data for the guidelines Czech Directive NV 354/2002 Sb. and 205/2009 Sb.
- Visualization of emission and operation data
- Linking emission data into existing computer networks (LAN) and process control systems

1.2 SYSTEM PROPERTIES

1.2.1 SYSTEM OVERVIEW

An STONE BASE system consists of (see figure on the following page):

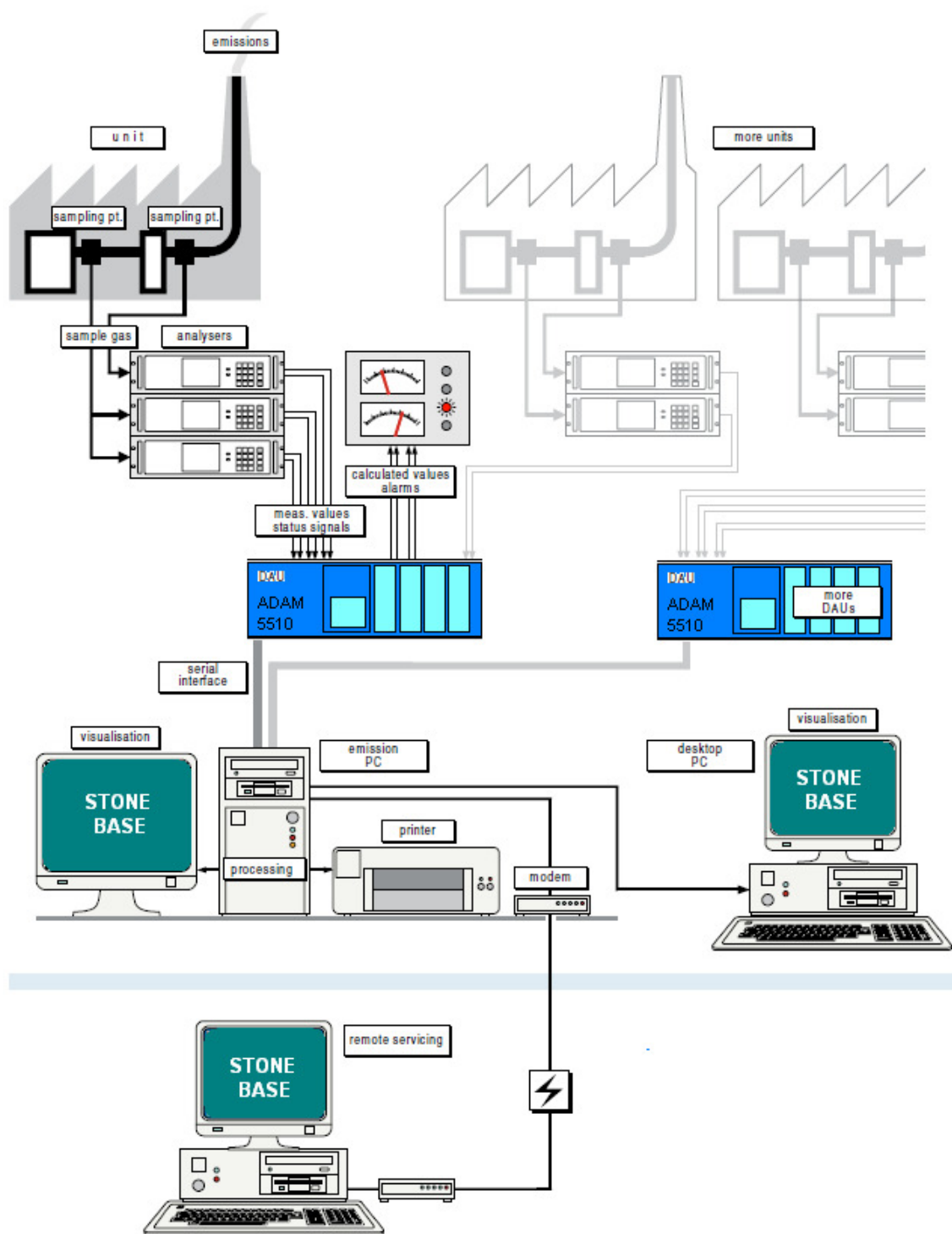
- Data acquisition units (DAU): these units collect measured data, process it, and send it to the emission PC.
- An emission PC: network-compatible personal computer under the Windows operating system. Many DAUs can be connected to the emission PC. It is also possible to receive and transmit data from a process control system.
- software: for saving, processing, and graphing measured data. Operates in Windows standard environment.

1.2.2 FUNCTIONS OF THE DATA ACQUISITION UNITS (DAUs)

DAU are microprocessor-controlled devices which acquire emission data. They can be installed locally and have the following functions:

- Calculate time interval averages
- Collect state signals
- Output analog and state signals
- The digital data (average values, changes of state) are transmitted to the emission PC by cable, fiber optics cable, or modem. A clock in the PC synchronizes the attached DAU.

STONE BASE System overview



1.2.3 STONE BASE PC FUNCTIONS

Captured signals

System functions in the emission PC

- Freely configure the entire data acquisition and evaluation system
- User administration with individual access and editing rights
- Remote configuration, control, and evaluation of all attached DAU
- Classification for official guidelines and ordinances
- Easy to read printed version of the categories
- All emission data are saved, even minute averages (For data security, mirror disks, streamers, and external raid arrays are options)
- Visualization of all acquired data
- Current of retrospection data
- Graphical or table display
- Configure what and how to display
- Receives and administers reports of fault
- Graphics and tables printed on local (color) printer
- Easy to link into superordinate computer networks (Windows NET)
- Remote maintenance possible with TESO customer service
- Desktop PCs may be connected to the emission PC as system monitors

System functions in desktop PCs

- All visualization functions as for the emission PC, display freely configurable
- Printed output as from the emission PC
- Receives and administers reports of fault

1.3 FEATURES OF THE STONE BASE SOFTWARE

1.3.1 PARAMETERIZING OPTIONS

You can set and modify the following parameters in the **STONE BASE** software:

Regulatory information"

- Facility definition
- Calculation of measured values
- Limit definitions
- special facility conditions (start-up operation or other specifics)

Facility operator settings, not regulated officially – examples:

- (Pre)alarms (limit messages)

1.3.2 SAFETY

- Graduated protection for system functions and data through graduated password protected access levels at login.

1.3.3 MEASUREMENT CLASSIFICATION

Classification of the interval and daily averages from evaluation of continuous emission measurements conforms to Czech Directive NV 354/2002 Sb. and 205/2009 Sb.. Daily,

monthly, and annual categories are recorded in easy to read tables. They can be displayed graphically

1.3.4 ACQUISITION AND CALCULATION OF EMISSION DATA

The following quantities are collected and calculated

- Minute value
- Minute value (corrected): normalized with oxygen and thermodynamic reference value
- Interval average values (raw): 30 minute averages
- Interval average value (corrected): normalized with oxygen and thermodynamic reference value
- Limits for average interval values
- Daily averages: Average based on average interval values for the day
- Limits for daily values
- Monthly and annual average values
- Daily, monthly, and annual classifications
- Changes of state
- Pollutant loads
- Daily, monthly, and annual loads (when parameterized)

1.3.5 STORING DATA

All data are stored on the emission PC hard drive.

1.3.6 INTERNAL DOCUMENTATION

- User -def ined names : All names for measurable quantities, sampling points, and facilities can be defined by the user (such as KKS).
- Parameterizable pin configuration assignment: The connection configuration of the DAU plug-in cards is printed directly from the program. If connections are wired incorrectly, the software can easily correct it.

1.3.7 ALARM BELL

Licenses for larger plants with numerous emitters often prescribe a limit for the sum of all pollutant loads. STONE BASE can easily perform an evaluation for such an alarm.

1.3.8 EVENT SEARCH

STONE BASE can search a facility or component for events like:

- Exceeding limits
- Flue gas purification system malfunctioning
- Unusual operating conditions
- Lockout times

1.3.9 REPORTS OF FAULT

For documenting limits exceeded, malfunctions, and other events requiring comments, reports of fault can be opened.

1.3.10 VISUALIZATION FUNCTIONS

- Data can be displayed either in real time or in retrospection from a past time.
- Line graphs, bar graphs, and tables are available display modes. The forms may also be combined.
- For a time in retrospect, you can select the time window with the mouse. The zoom function will then display the desired time interval as a detail.
- You can save any mask that you create. Each user can create a profile for the desired display scheme and retrieve it when needed. Mask creation is easy to learn.
- **STONE BASE** can generate and display process figures: An imported picture of the process, or a newly drawn picture, is used as the background. Data and text can be arranged on it as desired.

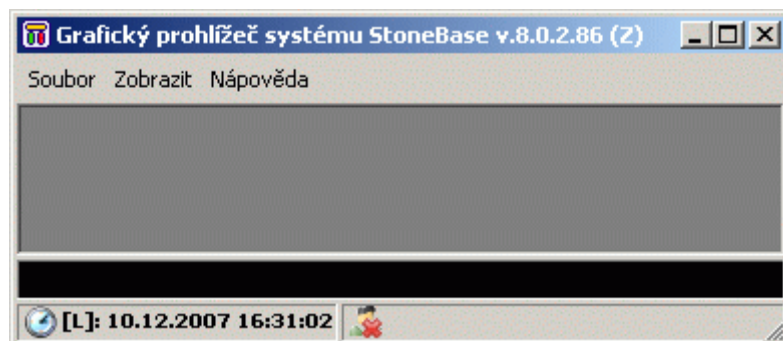
1.3.11 DATA EXPORT

- For external processing, the emission data can be exported.
- In retrospection mode, you can create tables and export them in ASCII format.

2 INTRODUCTION TO THE PROGRAM

2.1 BASIC PROGRAM COMPONENTS

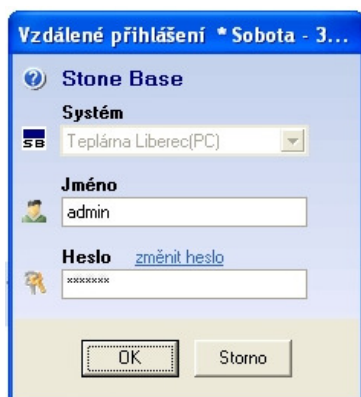
2.1.1 SYSTEM WINDOW



2.1.2 FUNCTION BAR

Soubor Konfigurovat Prezentace Schéma Upravit Kreslit Zvětšení Uspořádat Zobrazit Okno Nápověda

2.2 USER LOG-IN

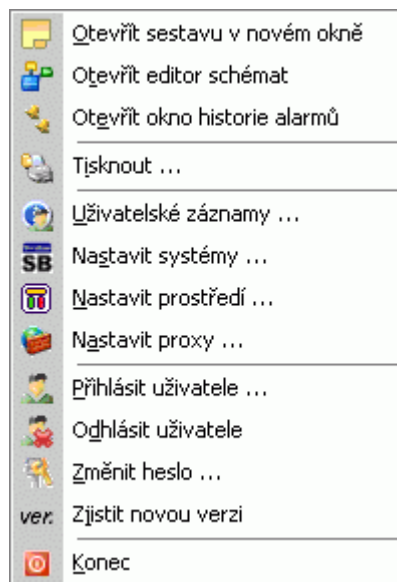


2.3 OVERVIEW OF PROGRAM SECTIONS



3 SYSTEM PROGRAM SECTION

3.1 CHANGING USER (NEW LOGIN)



3.3.1 PASSWORD

Změna hesla * Sobota - 30.1.201...

Stone Base

Systém
 Teplárna Liberec(PC)

Jméno
 admin

Původní heslo


Nové heslo


Potvrzení nového hesla

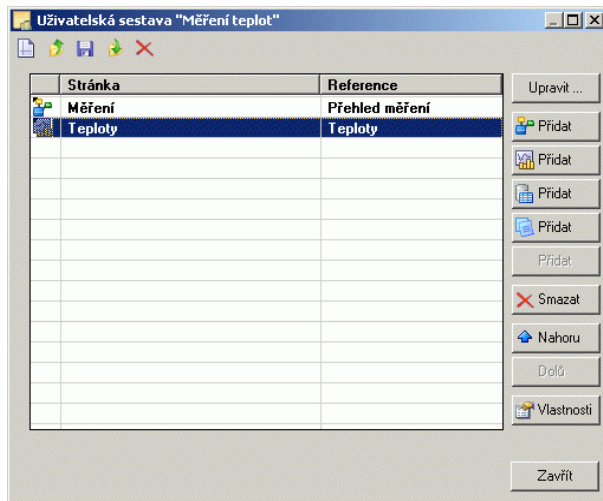

OK Storno

3.3.2 ACCESSES

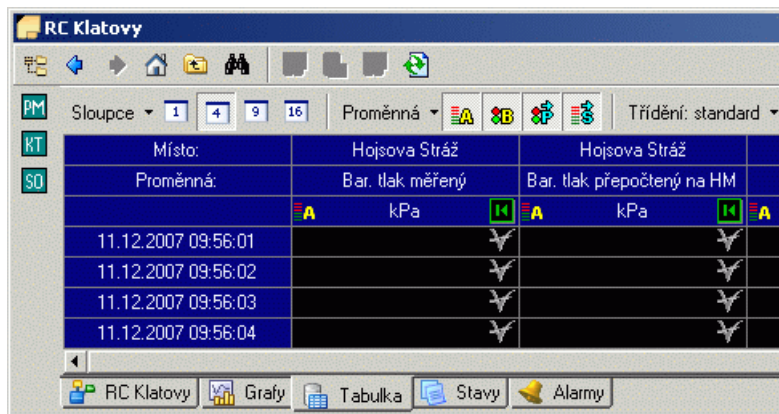
Č.	Blok.	Odst.	Akt.	Jednoznačné jméno	Uživatelský profil	Heslo	Změna hesla	Naposledy přihlášen
<input type="checkbox"/>	1			 #268 Nový uživatel	-	dočasné	povolena	-
<input type="checkbox"/>	2			 ADMIN	Administrátoři	stálé	povolena	05.12.2007 11:07:53
<input type="checkbox"/>	3			 cerny	Administrátoři	stálé	povolena	29.11.2007 13:57:44
<input type="checkbox"/>	4			 charvat	Chomutov	dočasné	povolena	03.12.2007 07:10:39
<input type="checkbox"/>	5			 chladkova	ŘAS	dočasné	povolena	09.11.2007 13:18:17
<input type="checkbox"/>	6			 chum	ŘAS	dočasné	povolena	04.12.2007 14:12:59
<input type="checkbox"/>	7			 Dispecer	Dispečink	stálé	zakázána	04.12.2007 21:20:26

- ☒ právo parametrizovat proměnnou
- ☒ právo suspendovat proměnnou
- ☒ právo povolovat proměnnou
- ☒ právo editovat archivní hodnoty proměnné
- ☒ právo potvrdit alarm
- ☐ právo modifikovat info
- ☐ rezervováno
- ☐ rezervováno
- ☒ právo dozorovat (přihlásit se konzolí)
- ☒ právo řídit uzly
- ☒ právo řídit drivery
- ☒ právo řídit servery
- ☒ právo modifikovat konfiguraci
- ☒ právo exportovat
- ☐ rezervováno
- ☐ rezervováno
- ☒ právo modifikovat schémata
- ☒ právo modifikovat programy
- ☒ právo modifikovat sestavy

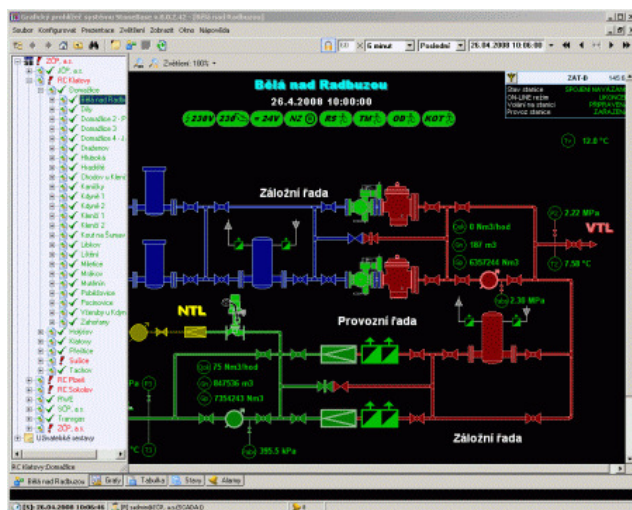
3.3.3 PROCESS ILLUSTRATIONS



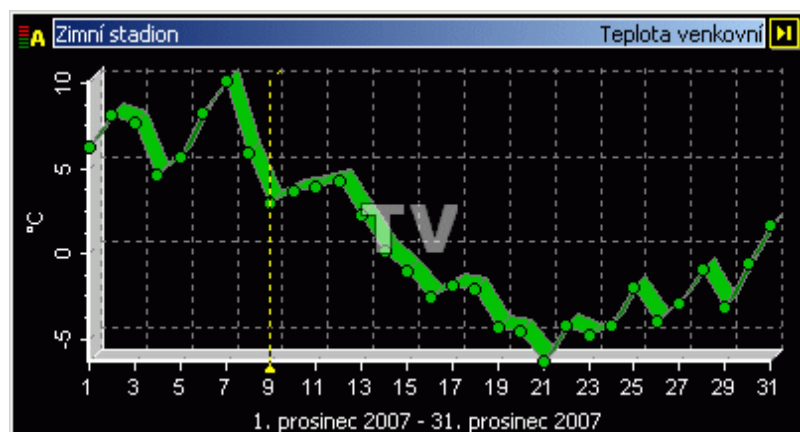
4 CURRENT PROGRAM SECTION



4.2 SCHEMA

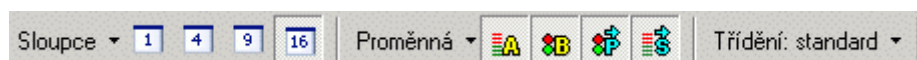


4.3 GRAPHS















Graph panel navigator



4.4 TABLES


















Místo:	m
Proměnná:	analog
	 
06.04.2007 15:55:00	8,8 ✓
06.04.2007 15:56:00	9,1 ✓
06.04.2007 15:57:00	9,0 ✓
06.04.2007 15:58:00	7,3 ✓
06.04.2007 15:59:00	8,4 ✓
06.04.2007 16:00:00	7,4 ✓
Počet platných	18
Minimum	0,8
Maximum	9,1
Rozdíl (max - min)	8,3
Součet	76,0
Průměr	4,2












4.5 STATUS TABLE



Proměnná      Stav       



















Třídění: standard   Proměnná začíná:

	Čas	Místo	Proměnná	Hodnota	Stav
	06.04.07 15:17:00	Stanice	 Teplota	 1,2 °C	Vyřazeno
	06.04.07 15:17:00	Stanice	 Povel	 -	Neměřeno
	06.04.07 15:17:00	Stanice	 Povel 1	 Stav (0)	Provozní stav
	06.04.07 15:17:00	Stanice	 SetPoint	 0	Provozní stav
	-	Stanice	 System	 -	Neměřeno

4.6 ALARM TABLE

Proměnná     Stav       

  Proměnná začíná: Alarm: 0/0

	Potvrdil	Čas	Místo	Proměnná	Hodnota	Úroveň
		08.12.07 04:15:07	Stanice ADAM 1	 Aktuální stav PLC	 VÝPADEK SPOJENÍ	 1 sek
		08.12.07 14:10:10	Stanice ADAM 1	 Aktuální stav PLC	 SPOJENÍ NAVÁZÁNO	 1 sek
	Dispecer	12.12.07 08:12:00	Turbosoustrojí 04	 Koncentrace CO	 120 mg/m3	 1 min
	Dispecer	12.12.07 08:13:00	Turbosoustrojí 04	 Koncentrace CO	 119 mg/m3	 1 min
	Dispecer	12.12.07 08:16:00	Turbosoustrojí 04	 Koncentrace CO	 122 mg/m3	 1 min

5 RETROSPECTION PROGRAM SECTION

5.1 EXPORT OF DATA

Parametry exportního profilu

Profil: Nový profil, skupina: Jednorázovka

Export Hodnoty Tabulka Hlavička Plánovač Test exportu

Parametry exportu

Režim exportu: manuální Perioda vzorků: 1-Denní

+/- Rozsah exportu +/-

0 1-Měsíční 0

Čas začátku exportu: 1.5.2007 6:00:00 Čas konce exportu: 1.6.2007 6:00:00

Exportní soubor

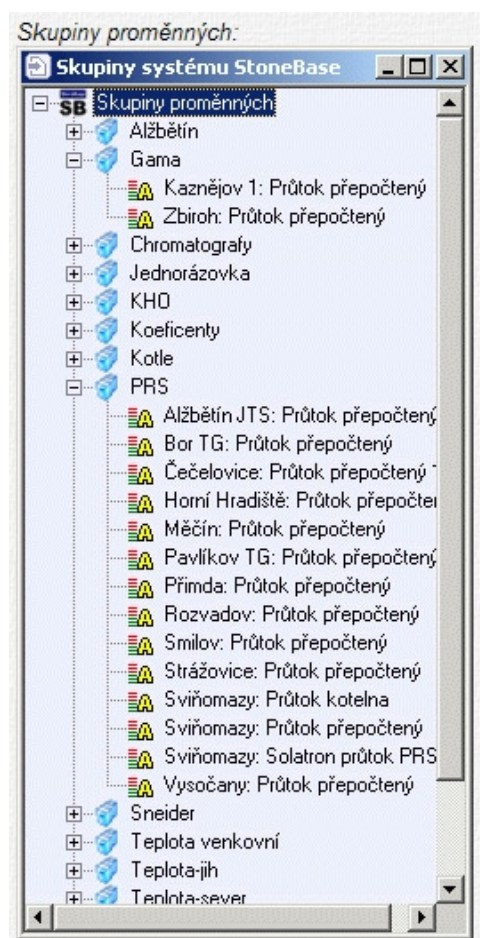
Jméno exportního souboru (může obsahovat časové masky)

C:\Program Files\SBASE\Export\SBExpTool\QExp-<RR><MM>.dat

Výsledný formát (jména exportního souboru (náhled))

C:\Program Files\SBASE\Export\SBExpTool\QExp-0707.dat

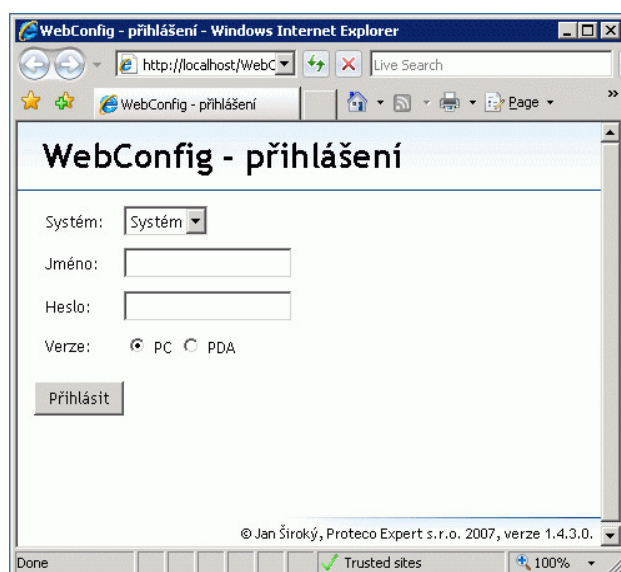
Zavřít

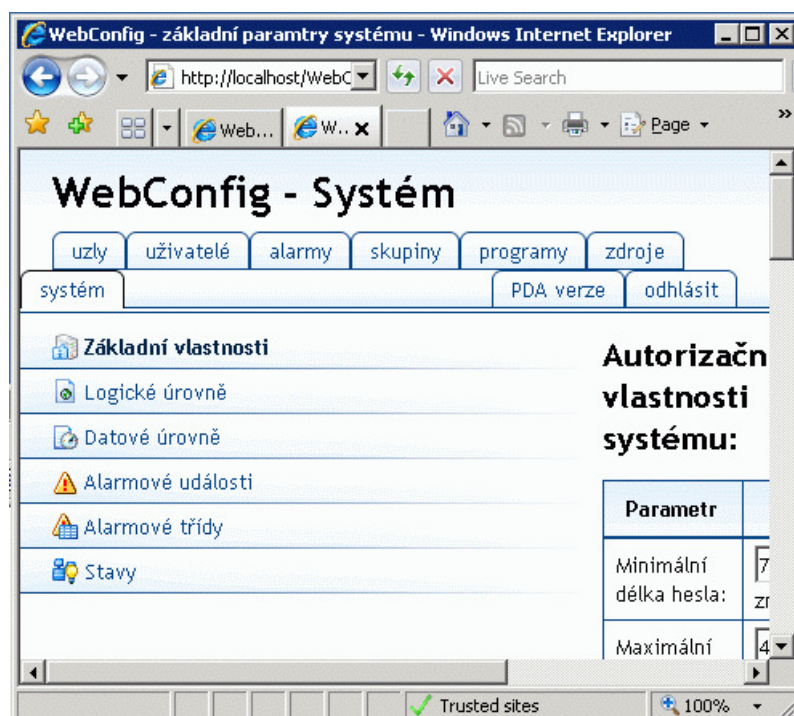


Choice of variables

6 CONFIGURATION PROGRAM SECTION

6.1 WEB CONFIGURATION PROGRAM SECTION





6.2 USING THE CONFIGURATION PROGRAM SECTION

uzly uživatelé alarmy skupiny programy zdroje systém

6.2.1 NODES OF VARIABLES

Parametr	Hodnota
Popisné jméno:	Suchdolsko
Jednoznačné jméno:	Suchdolsko
Exportní jméno:	Suchdolsko
Aktivní:	<input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
Vyloučení ze sumarizace:	<input type="checkbox"/> vyloučit
Vlastní sestava:	<input type="checkbox"/> ano
Jméno schématu:	-
Id:	561
Upraveno:	30.11.2007 09:28:53

6.2.2 USERS

Č.	Blok.	Odst.	Akt.	Jednoznačné jméno	Uživatelský profil	Heslo	Změna hesla	Naposledy přihlášen
<input type="checkbox"/>	1			#268 Nový uživatel	-	dočasné	povolena	-
<input type="checkbox"/>	2			ADMIN	Administrátoři	stálé	povolena	05.12.2007 11:07:53
<input type="checkbox"/>	3			cerny	Administrátoři	stálé	povolena	29.11.2007 13:57:44
<input type="checkbox"/>	4			charvat	Chomutov	dočasné	povolena	03.12.2007 07:10:39
<input type="checkbox"/>	5			chladkova	ŘAS	dočasné	povolena	09.11.2007 13:18:17
<input type="checkbox"/>	6			chum	ŘAS	dočasné	povolena	04.12.2007 14:12:59
<input type="checkbox"/>	7			Dispecer	Dispečink	stálé	zakázána	04.12.2007 21:20:26

6.2.3 ALARMS

Č.	Akt.	Jednoznačné jméno	Id	Upraveno
<input type="checkbox"/>	1	A-PRUTOK	4	01.12.2006 14:32:26
<input type="checkbox"/>	2	A-TEPLOTA	3	07.02.2007 14:21:46
<input type="checkbox"/>	3	A-TLAK	1	01.12.2006 14:30:21
<input type="checkbox"/>	4	A-TLAKDIF	2	01.12.2006 14:31:13

6.2.3 GROUPS



Č.	Akt.	Jednoznačné jméno	Id	Upraveno
<input type="checkbox"/>	1	Běsno průtok	14	11.10.2007 15:43:02
<input type="checkbox"/>	2	export_na_pozadavek	8	01.03.2007 14:40:41
<input type="checkbox"/>	3	kontrola	5	01.03.2007 14:40:41

6.2.4 CATEGORY OF VARIABLES

Č.	Akt.	Jednoznačné jméno	Id	Upraveno
<input type="checkbox"/>	1	Barometrický tlak	20	11.12.2006 15:19:18
<input type="checkbox"/>	2	Barometrický tlak HM	22	11.12.2006 15:19:59
<input type="checkbox"/>	3	Barometrický tlak měřený	21	11.12.2006 15:19:37
<input type="checkbox"/>	4	Diferenční tlak	67	07.02.2007 11:06:47

6.2.5 PROGRAM SCRIPTS OF VARIABLES


Č.	Akt.	Jednoznačné jméno	Id	Upraveno
<input type="checkbox"/>	1	 AkuVypocet	100	06.03.2007 14:52:52
<input type="checkbox"/>	2	 NahrHodnota	110	06.03.2007 14:52:27
<input type="checkbox"/>	3	 Prumer VT	117	14.03.2007 15:50:41
<input type="checkbox"/>	4	 Prutok	101	05.03.2007 16:08:04
<input type="checkbox"/>	5	 Rozdil	118	13.03.2007 12:40:09
<input type="checkbox"/>	6	 Rwe kWh	114	06.03.2007 14:51:05

Parametr	Hodnota
Jednoznačné jméno:	<input type="text" value="AkuVypocet"/>
Verze kódu:	<input type="text" value="0"/>
Aktivní:	<input checked="" type="radio"/>  <input type="radio"/> 
Spouštěn na značku:	<input type="checkbox"/>
Sekce "Common":	<div>Dim TimeAct As Double Dim ValueAct As Double</div>
Sekce "OnInit":	<div></div>
Sekce "OnRun":	<div>ValueRes = 0 StatusRes = 0 If Res <> 0 Then FGetError Msg CRunError = 1002 CErrorMsg = " Tlakl - čtení pře GoTo HandleError</div>
Id:	100
Upraveno:	06.03.2007 14:52:52

6.2.6 PROGRAM SOURCES

 **Texty**

 **Barvy**

 **Obrázky**

 **Zvuky**

6.2.7 PROGRAM PROPERTIES

Parametr	Hodnota
Minimální délka hesla:	<input type="text" value="7"/> znaků
Maximální doba platnosti hesla:	<input type="text" value="40"/> dnů (1 - x, 0 znamená platné stále)
Počet hesel udržovaných v historii:	<input type="text" value="5"/> (0 - 5)
Maska požadavků na složitost hesla:	<input type="text" value="2050"/>
Nabídnout změnu před vypršením hesla:	<input type="text" value="1"/> dnů (0 - x)
Globální zákaz změny hesla:	<input type="checkbox"/> zakázáno
Počet povolených chybných přihlášení:	<input type="text" value="0"/> (1 - x, 0 znamená neomezený počet)

7 APPENDIX: HARDWARE INFORMATION7

7.1 PC SPECIFICATIONS

7.1.1 EMISSION PC

Processor:	Intel® Core™2 Duo 2,8 GHz
Operation memory:	2 GB 800 MHz DDR2
Grafická karta:	simply integrated
HDD:	320 GB 7200rpm serial ATA
Optical drive:	DVD+-RW
Network card:	10/100/1000 Ethernet
Operation system:	Windows® XP Professional

7.2 DATA ACQUISITION UNIT (DAU)

7.2.1 DAU CHASSIS

Data acquisition units Advantech ADAM 5510

Introduction

The ADAM-5510 is ideal for PC-based data acquisition and control applications. It is a compact, standalone controller with an Intel x86- based CPU running Datalight ROM-DOS. Built-in battery backup SRAM is the best choice for complex logic or data storage applications. For professional C/C++ programmers, the ADAM-5510 series application programs may be written and compiled in Inprise (Borland) Turbo C, and downloaded to the ADAM-5510. With the power of the ADAM- 5510, users can easily accomplish specialized functions which are difficult with traditional controllers. Each ADAM-5510 system can handle up to 4 I/O slots (up to 64 I/O points).

Specifications

		ADAM-5510
Communications	Communication	(COM2 RS-485)
	Max.Nodes	256 for Ethernet, 32 for RS-485
	Protocol	User Defined Modbus/RTU Modbus/TCP
Control System	CPU	80188
	OS	ROM-DOS
	RAM	640KB
	Real-time Clock	Yes
	Remote I/O	Modbus Device
	Watchdog Timer	Yes
Power Supply	Power Requirement	+10 ~ +30 VDC



7.2.2 DAU ANALOG INPUT CARD

Main Features

Channels: 8 differential
Effective resolution: 16-bit
Input type: mV, V, mA
Isolation voltage: 3000 VDC
Sampling rate: 10 samples/sec. (total)
Accuracy: $\pm 0.1\%$ or better
Fault and overvoltage protection: withstands overvoltage up to ± 35 V
Input range: ± 150 mV, ± 500 mV, ± 1 V, ± 5 V, ± 10 V; ± 20 mA

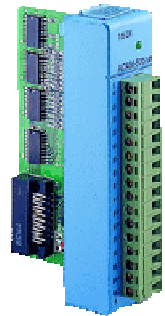


7.2.3 DAU STATE INPUT CARD

Main Features

Channels: 16
Input voltage: 30 Vmax
Circuit type: Pull-Up current: 0.5 mA (Source Type)

Power consumption: 0.53 W

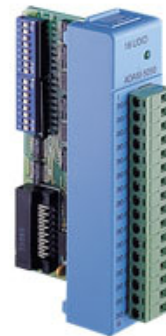


7.2.4 DAU STATE OUTPUT CARD

Main Features

Channels: 16
I/O Type: bit-wise selectable by DIP switch
Digital input: Support Dry/Wet Contact
Digital output: Open Collector to 30 V, 450 mW max. Ic

Power consumption: 0.35 W (typical); 1.2 W (max)



RS-232 to RS-422/485 Converters

Main Features

- Automatic RS-485 data flow control
- 3000 VDC isolation protection
- Surge protection RS-485 data line
- Transmission speed up to 115.2 Kbps
- Networking up to 1200 meters (4000 feet)
- Reserved space for termination resistors
- Power and data flow indicator for troubleshooting
- Power requirement: +10 to +30 VDC

Mounts easily on a DIN-rail, panel or piggyback

