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SIBO


# SIB 100-TS Series

Arbitrary 4-Quadrant
Voltage and Current Amplifiers

400 W - 18.000 W
DC ... 200 kHz / 1 MHz

# Arbitrary 4-Quadrant Voltage and Current Amplifiers SIB 100-TS Series 400 W - 18.000 W DC - 200 kHz / 1 MHz

SIB 110-35N-TS

## Special Features

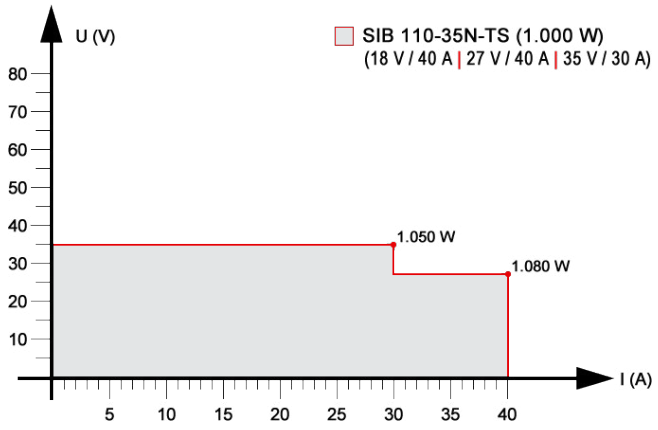
- DC ... 200 kHz full range bandwidth
- DC ... 1 MHz (small signal -3 dB)
- Output voltage 35 V / 70 V / 75 V
- Rise time / fall time 100 V/µs
- Arbitrary function with 1.000.000 memory data points
- Internal impedance less than 10 mΩ
- Recovery time less than 0.1 ms
- Analogue input 0 ... ±10 V for voltage or current control
- Monitor outputs for measured values of voltage and current
- WaveMaster software for graphical waveform generation
- Simulation of imported oscilloscope signals
- Modularly expandable in Master/Slave mode
- USB interface standard
- Voltage step less than 0.1 V
- Voltage resolution less than 0.01 V
- Voltage ripple less than 0.1 Vp-p
- Good continous heat dissipation

## Instrument Overview

### +35 V / -16 V

| Models | Range 1 18 V | Range 2 27 V | Range 3 35 V | Output Power | Size |
|---|---|---|---|---|---|
| SIB 104-35N-TS | 20 A | 11 A | 11 A | 400 W | 3 U |
| SIB 110-35N-TS | 40 A | 40 A | 30 A | 1.000 W | 4 U |
| SIB 120-35N-TS | 76 A | 76 A | 57 A | 2.000 W | 14 U |
| SIB 130-35N-TS | 114 A | 114 A | 85 A | 3.000 W | 18 U |
| SIB 140-35N-TS | 152 A | 152 A | 114 A | 4.000 W | 22 U |
| SIB 150-35N-TS | 190 A | 190 A | 143 A | 5.000 W | 26 U |
| SIB 160-35N-TS | 228 A | 228 A | 171 A | 6.000 W | 30 U |
| SIB 180-35N-TS | 304 A | 304 A | 228 A | 8.000 W | 2 x 22 U |
| SIB 200-35N-TS | 380 A | 380 A | 285 A | 10.000 W | 2 x 26 U |
| SIB 220-35N-TS | 456 A | 456 A | 342 A | 12.000 W | 2 x 30 U |
| SIB 250-35N-TS | 570 A | 570 A | 429 A | 15.000 W | 3 x 26 U |
| SIB 280-35N-TS | 684 A | 684 A | 516 A | 18.000 W | 3 x 30 U |

## Voltage Ranges



SIBO

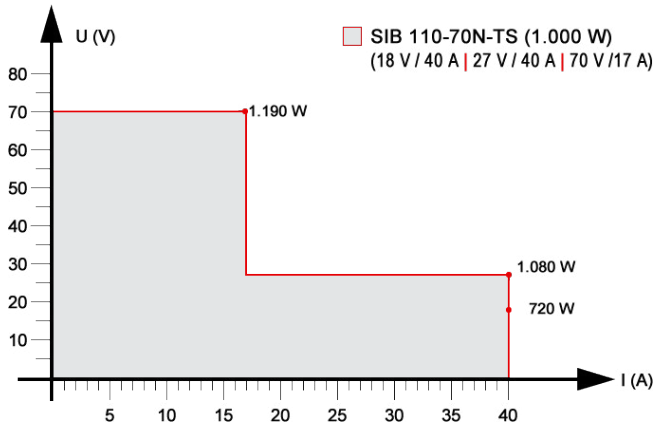
# ✓ Outstandingly Powerful
# ✓ Modular Design
# ✓ Unlimited Signal Waveforms

## Instrument Overview

### +70 V / -16 V

| Models | Range 1 +18 V | Range 2 +27 V | Range 3 +70 V | Output Power | Size |
|---|---|---|---|---|---|
| SIB 105-70N-TS | 15 A | 10 A | 7,5 A | 500 W | 3 U |
| SIB 110-70N-TS | 40 A | 40 A | 17 A | 1.000 W | 4 U |
| SIB 120-70N-TS | 76 A | 76 A | 32 A | 2.000 W | 14 U |
| SIB 130-70N-TS | 114 A | 114 A | 49 A | 3.000 W | 18 U |
| SIB 140-70N-TS | 152 A | 152 A | 65 A | 4.000 W | 22 U |
| SIB 150-70N-TS | 190 A | 190 A | 81 A | 5.000 W | 26 U |
| SIB 160-70N-TS | 228 A | 228 A | 97 A | 6.000 W | 30 U |
| SIB 180-70N-TS | 304 A | 304 A | 129 A | 8.000 W | 2 x 22 U |
| SIB 200-70N-TS | 380 A | 380 A | 162 A | 10.000 W | 2 x 26 U |
| SIB 220-70N-TS | 456 A | 456 A | 194 A | 12.000 W | 2 x 30 U |
| SIB 250-70N-TS | 570 A | 570 A | 242 A | 15.000 W | 3 x 26 U |
| SIB 280-70N-TS | 684 A | 684 A | 291 A | 18.000 W | 3 x 30 U |

## Voltage Ranges




## Selectable Operating Voltage

Three selectable operating voltage ranges allow to adapt to applications for high voltage / low current or low voltage / high current. The power is almost constant.

Especially when controlling extremely low impedance loads, the operating voltage range can be reduced to one third of the maximum output voltage. This leads to an immense reduction of power dissipation.

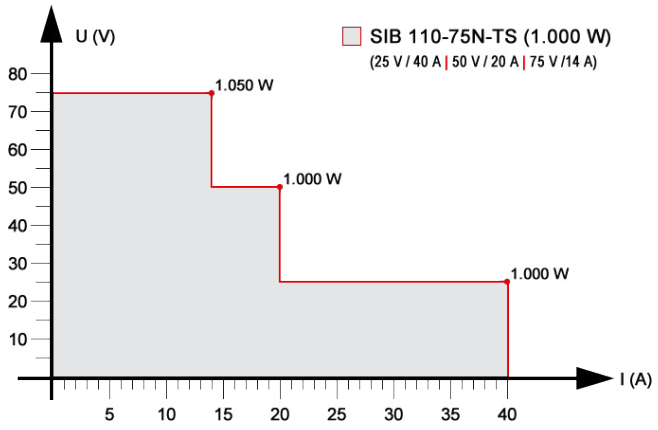
→ Reduction of power dissipation
→ One system for 12 V / 24 V / 48 V vehicles

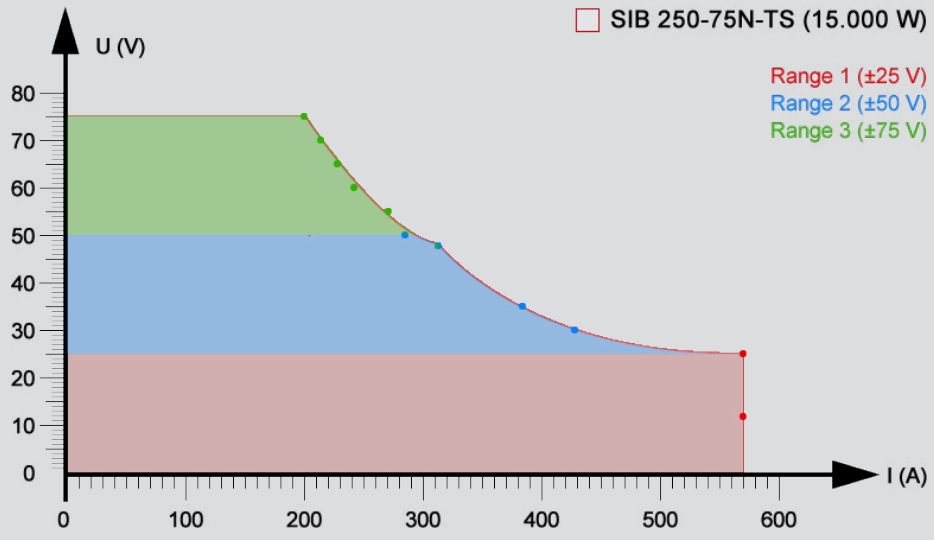
# Arbitrary 4-Quadrant Voltage and Current Amplifiers SIB 100-TS Series 400 W - 18.000 W DC - 200 kHz / 1 MHz

Instrument Overview

## +75 V / -75 V

| Models | Range 1 ±25 V | Range 2 ±50 V | Range 3 ±75 V | Output Power | Size |
|---|---|---|---|---|---|
| SIB 105-75N-TS | 11 A | 8 A | 5,5 A | 500 W | 3 U |
| SIB 110-75N-TS | 40 A | 20 A | 14 A | 1.000 W | 4 U |
| SIB 120-75N-TS | 76 A | 38 A | 27 A | 2.000 W | 14 U |
| SIB 130-75N-TS | 114 A | 57 A | 40 A | 3.000 W | 18 U |
| SIB 140-75N-TS | 152 A | 76 A | 53 A | 4.000 W | 22 U |
| SIB 150-75N-TS | 190 A | 95 A | 67 A | 5.000 W | 26 U |
| SIB 160-75N-TS | 228 A | 114 A | 80 A | 6.000 W | 30 U |
| SIB 180-75N-TS | 304 A | 152 A | 106 A | 8.000 W | 2 x 22 U |
| SIB 200-75N-TS | 380 A | 190 A | 133 A | 10.000 W | 2 x 26 U |
| SIB 220-75N-TS | 456 A | 228 A | 160 A | 12.000 W | 2 x 30 U |
| SIB 250-75N-TS | 570 A | 285 A | 200 A | 15.000 W | 3 x 26 U |
| SIB 280-75N-TS | 684 A | 342 A | 240 A | 18.000 W | 3 x 30 U |






Test System with 4 kW

# Test System Architecture

## General

The SIB 100-TS series are linear precision 4-quadrant power amplifiers for fast voltage and current signals - each positive and negative (bipolar).

They also work as sink in applications to absorb power. Extremely high bandwidth at highest power requirements, necessary for fast signals, characterizes this series.

Especially these amplifiers are characterized by their signal quality.

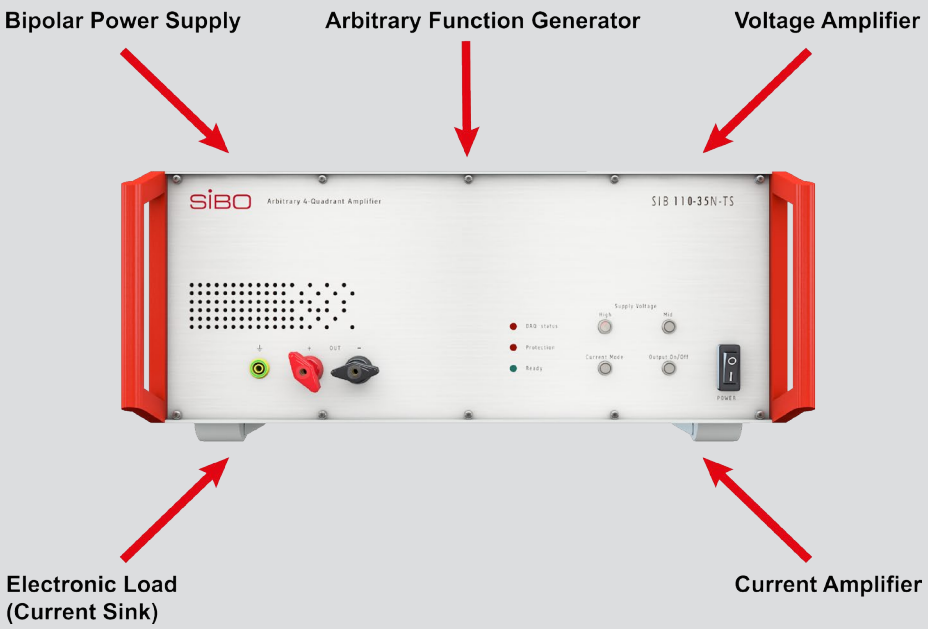
## Arbitrary Functionality

SIBO´s arbitrary power amplifiers include a huge memory of 1.000.000 data points to store arbitrary waveforms in the instrument itself. No arbitrary waveform generator or any other controlling instrument is needed.

This makes these 4-quadrant amplifiers unique in the world market.

The easy-to-use WaveMaster software, that is standard in scope of delivery, allows to generate waveforms by means of a graphical user interface or via tabular input.

## Multiple Instrument Functions In One Device




## Monitor Outputs

Located on the back of the instruments there are monitor outputs for voltage and current with the respective measured values.

Output values are 0 ... ±10 V
for 0 ... $\pm V_{rated}$ respectively 0 ... $\pm I_{rated}$.

The current is measured by means of an internal shunt with an accuracy of approx. 1 %.

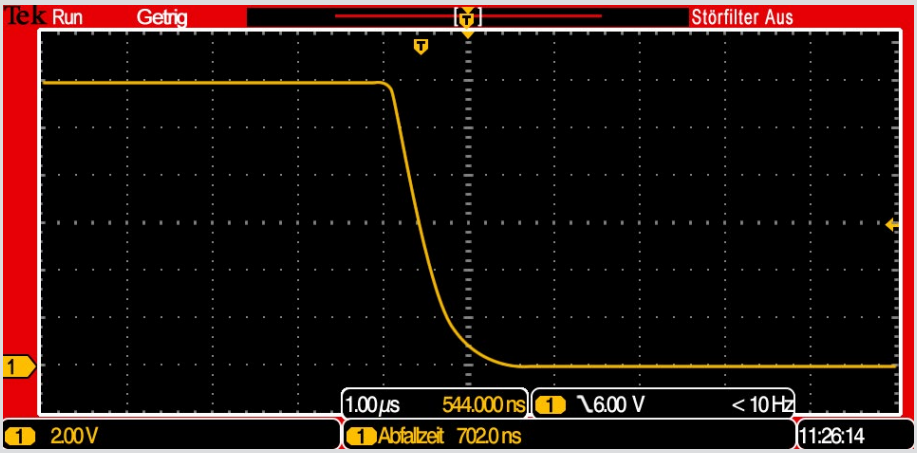
Optionally a current sensor with 0.01 % accuracy can be integrated easily.

## Ouput ON/OFF

With its output on/off switch at the front of the instruments, the output can be activated or deactivated. When deactivating, there is a completely galvanic interruption to the tested devices.

## Signal Quality

- Rise time: < 1 µs
- Fall time: < 1 µs
- No overshot / no undershot




## Protective Functions

Various protective functions avoid damage of the instrument and also guarantee protection for tested devices.

Output voltage and current can be limited and also over-temperature shutdown is included.

The inside calculation of power dissipation and totally monitoring of current ensure perfect short circuit and over-voltage protection.

Also for security aspects an interlock shut down can be triggered.

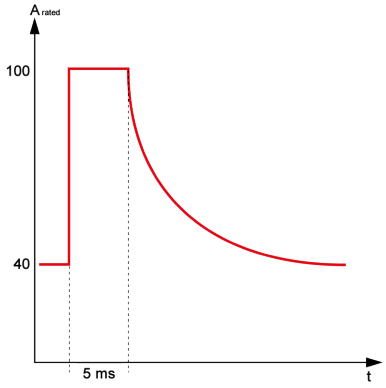
## Short-Time Current

In a period of time of 5 ms, the amplifier systems supply a short-time current.

E.g. the 1.000 W instruments with their 40 A reach 100 A.

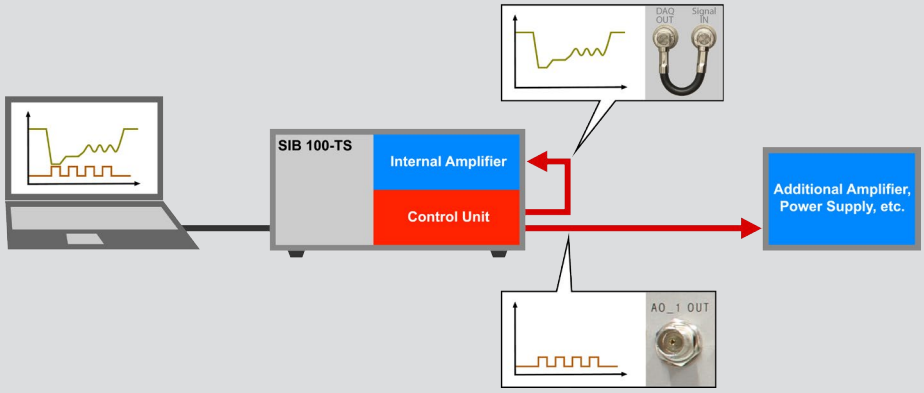
Generally the instruments provide a short-time current of two and a half times their nominal current.

## Short Time Current At SIB 110-75N-TS



# Test System Architecture

Analog Amplifier / Signal Processing




2 Analog Outputs (16 bit), 2,8 MS/s
(optional 4 / 8 via external control unit)

- First output for control of the internal amplifier
- Second output for control of external hardware (amplifier / power supply)

4 Counter Inputs/ Outputs

- Electronic switch S5
- Electronic switch S5 negated

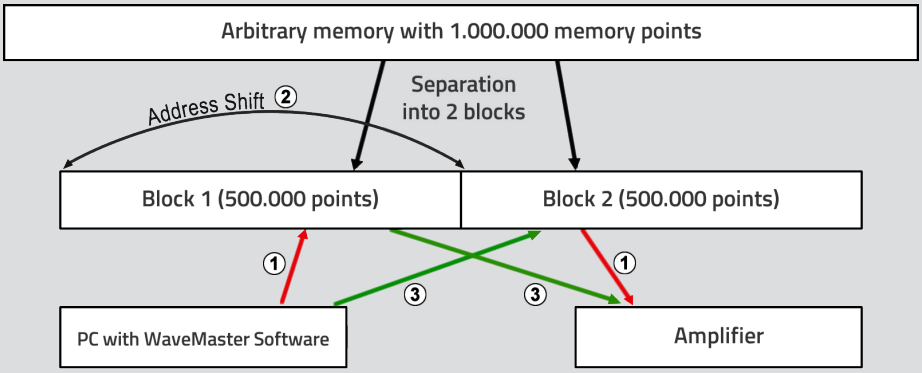
16 Analog Inputs

- Monitor U (internally wired) (New HMI)
- Monitor I (internally wired) (New HMI)
- Remaining inputs for measurements at user defined measuring points (New HMI)

24 Digital Inputs/ Outputs

- Run-Bit
- External Trigger
- Internal Trigger

## Unlimited Waveform Memory




① While the PC transfers data to block 1 of the arbitrary memory, block 2 is sending data to the amplifier part.

② After block 2 is done with its signal data, an address shift occurs.

③ While the PC transfers data to block 2 of the arbitrary memory, block 1 is sending data to the amplifier part.

⇨ This technology enables an endless, continuous data stream to the amplifier.

- ⇨ Compared to a function generator with its limited arbitrary memory there is no limitation of the size of the waveform.
- ⇨ A waveform with small spikes and interruptions of e.g. 100 µs and long constant levels in between can be simulated easily.

# Analog Remote Control / Modular Design

## Amplifier Control From PC

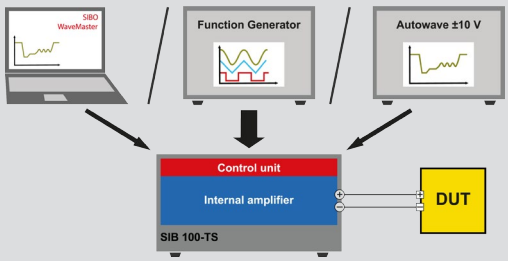
There are many ways to control SIBO amplifier systems:

- SIBO WaveMaster Software
  This PC software generates waveforms, sends the curves to the internal data memory and runs the process. All selections in the instrument are done automatically.

- Function Generator
  Standard function generators can be connected directly to the input of the amplifier.

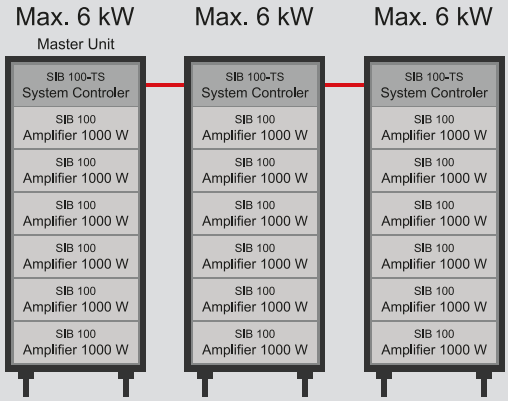
- Autowave, VT System (Vector), etc.
  Through their 0..±10 V input, other control units can be used for waveform generation. Automated test systems don´t need programming adaptions.

## Multiple Control Possibilities




With an optional isolation amplifier, the instruments have two analog inputs. These inputs are added in the isolation amplifier. This allows to add e.g. an interference on a standard waveform.

## Modular Concept / Modularly Expandable




- Modular hardware architecture
- Starting with one single unit of e.g. 1 kW
- Extension up to 18 kW in parallel
- Building up 3-phase systems with up to 6 kW per phase
- Serial connection for increasing voltage
- In case of a defective module, only this module needs to be repaired
- Each module has its own indication for functional capability

## Voltage And Current Control

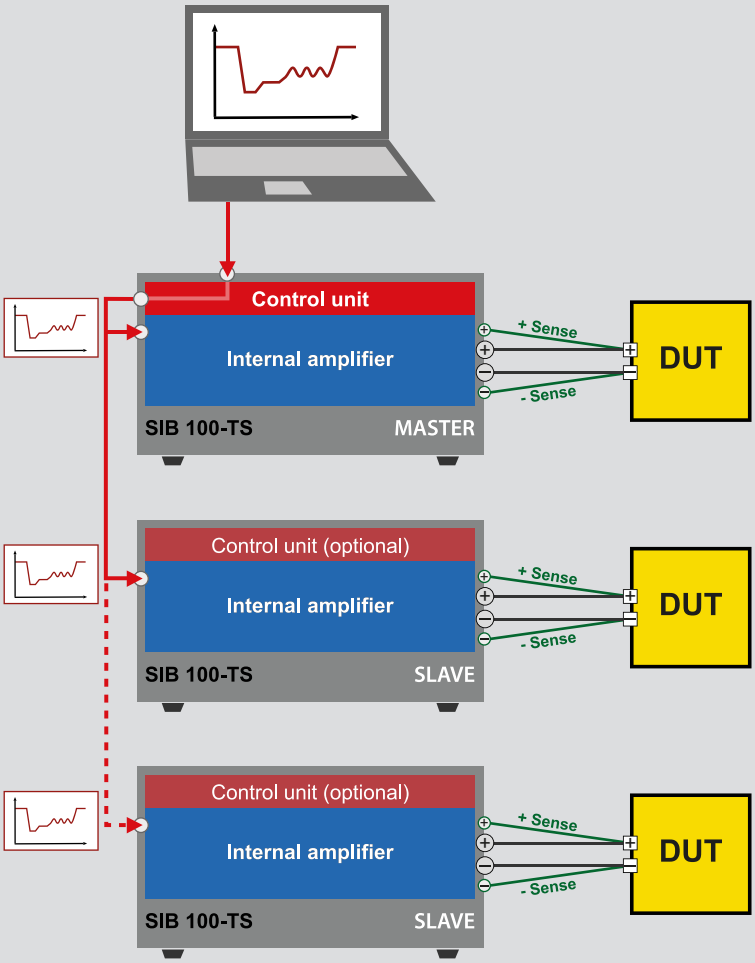
Both voltage and current control of the comprehensive amplifiers is possible. This can be selected on the front panel of the instrument.

Control input is 0 ... ±10 V
for 0 ... $\pm V_{rated}$ respectively 0 ... $\pm I_{rated}$.

An optional compensation network for current control is necessary, which achieves highest slew rates and signal quality for current signals.

# Cascading

## Synchronous DUT Control




## One Waveform, Many Amplifiers

- One waveform can be simulated synchronously with several amplifiers
- Each DUT has its own sense

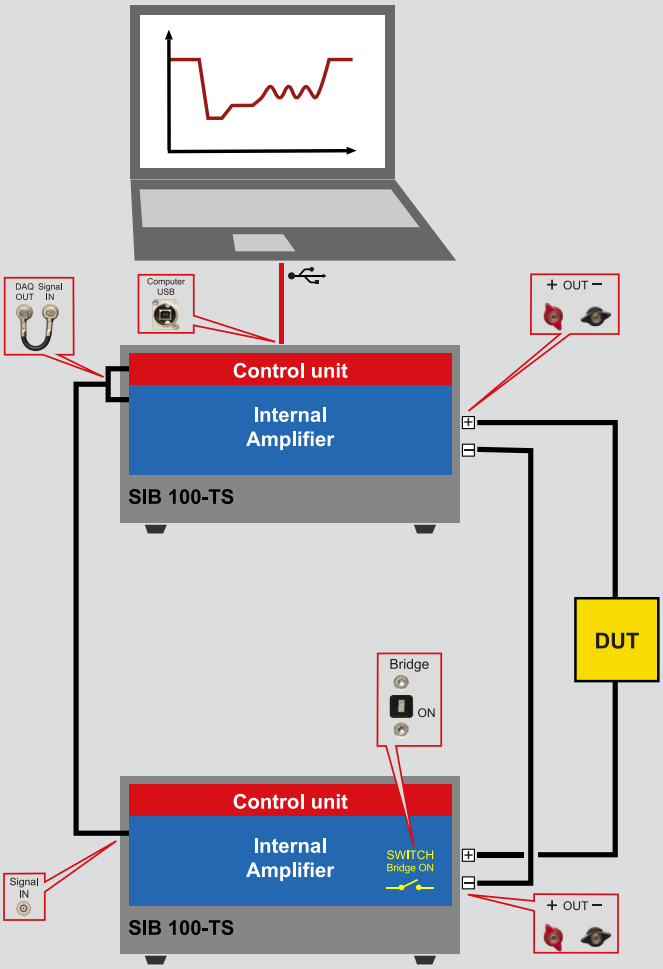
# Serial Operation

## Serial Operation

For high-voltage applications, instruments can be connected.

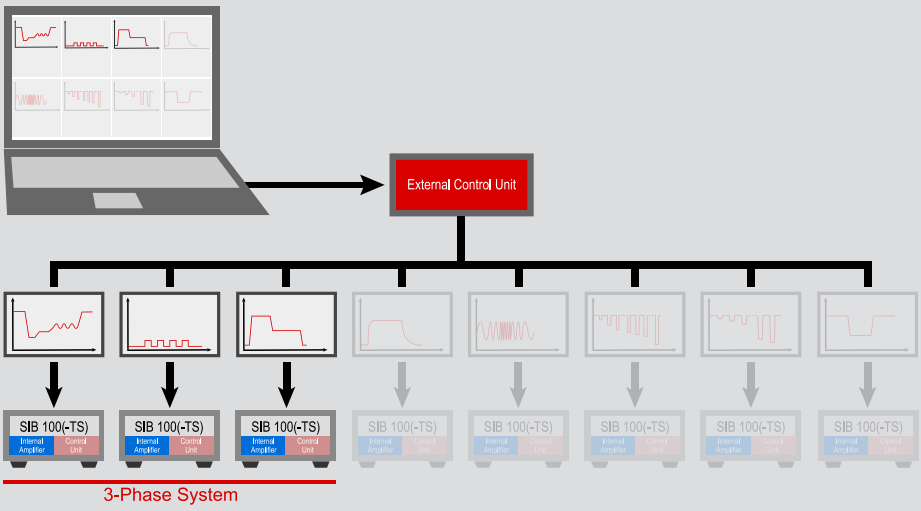
- Two instruments can be connected in series. Bridge switch must be toggled at one amplifier
- For three and more instruments in series, an internal isolation amplifier in each instrument is necessary

## Two Instruments In Series



# Parallel Operation / Synchronous Waveform Generation

Up To 8 Instruments With Different Waveforms




Parallel Synchronous Waveforms

The standard test system has two analog outputs for generating two waveforms synchrounously.

An optional external control unit is available for 2/ 4 / 8 synchronous output channels. Independent waveforms on each channel can be generated with SIBO´s WaveMaster Software.

An external trigger runs the waveforms in parallel and synchronously. Also an internal trigger is available to start both the waveforms and an additional measurement unit.

# WaveMaster Software

## Waveform generation and 4-quadrant amplifier control

### Special Features

- Easy to use graphical waveform editor and tabular input possibility
- Command library for integration into automated test systems
  - LabView(TM)
  - Vector CANoe (CAPL)
  - C#
  - C++
  - ANSI C
  - Python
  - etc.
- Simulation of imported oscilloscope signals
- Waveform trigger caused by external TTL signal (rising edge) for synchronization
- Macro function for execution of automated tests

### Waveform Generation

The powerful and easy to use WaveMaster software is unique in world market. Without any knowledge in software development, construction of ordinary and complex waveforms is dead easy.

A graphical waveform editor allows to generate individual curves in a flash. Also with a tabular input all kinds of waveforms can be produced immediately.

The simplicity how fast to import data out of oscilloscopes is amazing. Read in ASCII data files is possible in the same way.

### Digital Interface USB

All functionalities of the 4-quadrant amplifiers are available in WaveMaster software for controlling the instruments.

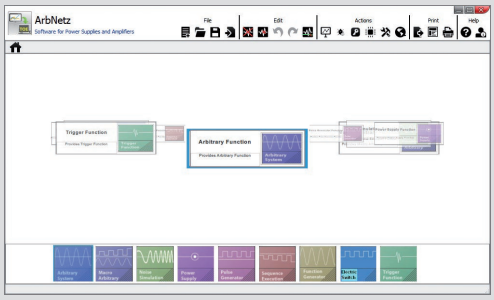
Short time current on/off, output on/off, operating voltage range and other functions can be easily set with its USB interface.

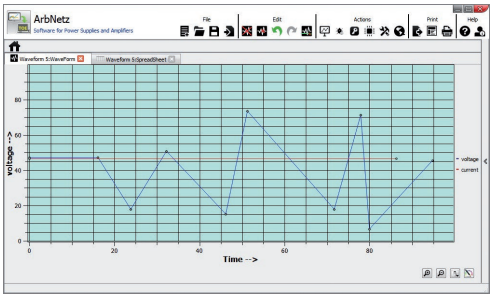
### Trigger Function

A hardware trigger input can be activate to monitor a TTL input signal on its rising edge. Synchronous waveform simulation, measurement and testing tasks are predestined applications.

### Macro Function

With a comfortable macro editor and its execution, selected waveforms run sequentially. Bursts, repetitions and loops make testing easy without any software coding.



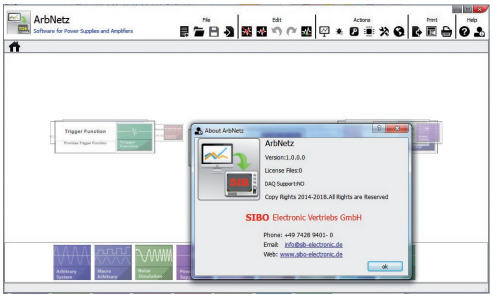
## WaveMaster Remote DLL

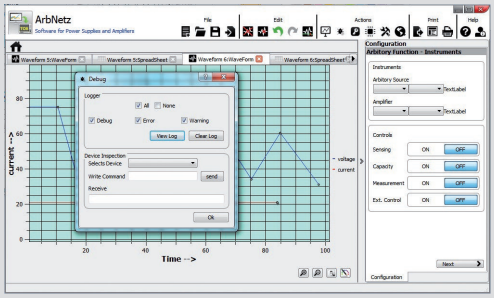
With the WaveMaster remote DLL´s, available for nearly all programming languages, with its command library, users control the 4-quadrant amplifiers in an absolute perfection.

There is no need to handle hardware interfaces such as USB or LAN. One command for each function handles all interfaces. Data files are sent to the instrument within milliseconds. No need to concern about memory space and resolution of the amplifiers.

A simple “load” command calculates the best resolution of the waveform that is possible and sends data to the arbitrary unit. In every DLL (LabView™, Vector CANoe, C#, C++, ANSI C, Python, etc.), commands are identical.

This makes switching between programming languages convenient. Commands for creating waveforms out of user programming surroundings are included as well. Variable waveforms for simulation of increasing ramps in time, variation of frequency and many other applications are typical test scenarios.

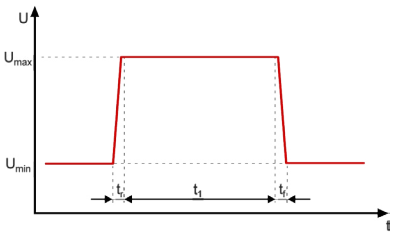


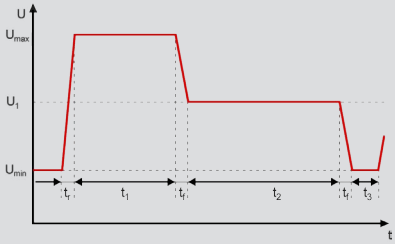
# Automotive Standard LV124 (VW80000) E-01 ... E-16

**One of the main standards in automotive industries is LV124 / VW80000. With these systems, this standard can be simulated easily. The waveform library contains all electronic tests out of this specification.**

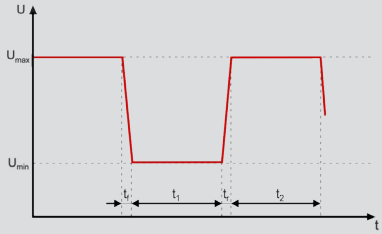
**For E-17 ... E-22 please ask for our fully automated Test System**



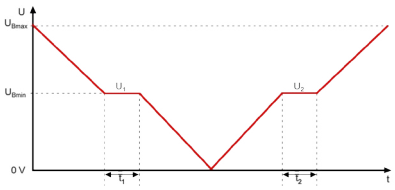

E-01 Long-term overvoltage



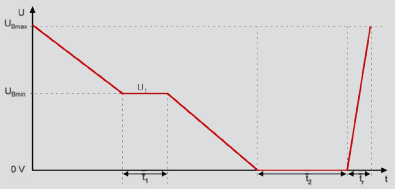

E-02 Transient overvoltage



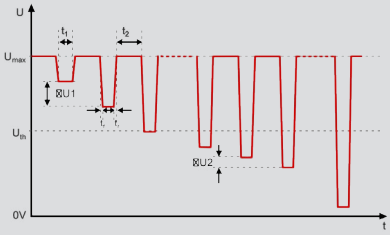

E-03 Transient undervoltage



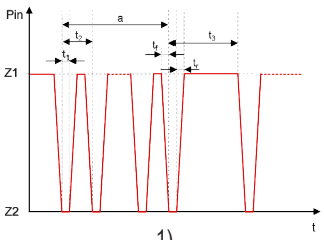

E-07 Slow decrease and increase of the supply voltage



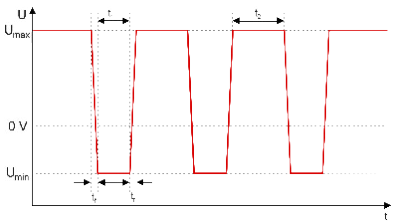

E-08 Slow decrease, quick increase of the supply




E-09 Reset behaviour




E-13 Pin interruption [1]

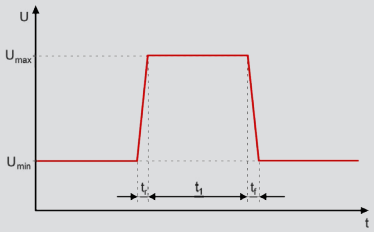



E-15 Reverse polarity (dynamic)

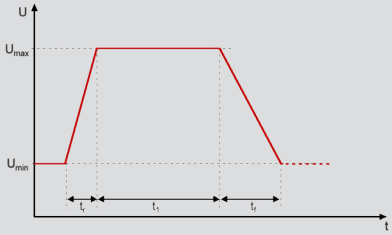
[1] Additional electric switch necessary

[2] Additional power supply necessary

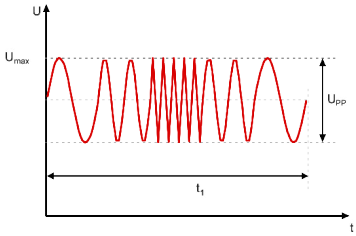
# Other Standards Such as LV148, ISO 16750, ISO 7637, DIN 40839, GS 95024, ..., Can Be Simulated Equivaltently



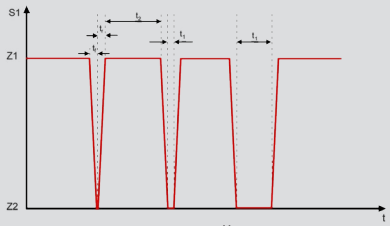

E-04 Jump start



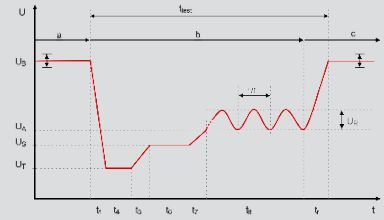

E-05 Load dump



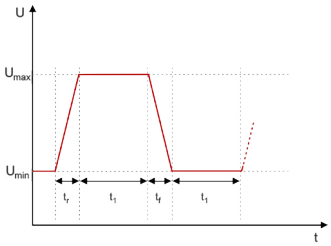

E-06 Superimposed alternating voltage



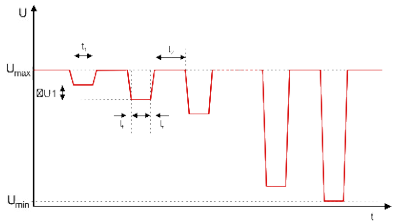

E-10 Short interruptions 1)



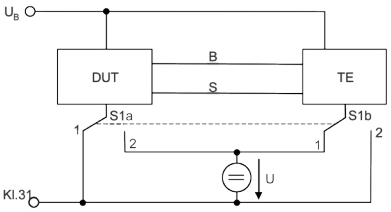

E-11 Start pulses




E-12 Voltage curve with intelligent generator




E-15 Reverse polarity (static)




E-16 Ground offset 2)

## Vehicle And Avionic Applications

The SIBO arbitrary 4-quadrant amplifiers are predestined to simulate vehicle and avionic standards such as LV 124 / VW 80000, LV148, ISO 7637, DIN 40839, ISO 16750, GS 95024 and many other related norms.

These waveforms and also a wide range of company-specific car manufacturer standards (BMW, Daimler, VW, ...) are included in the standard package.

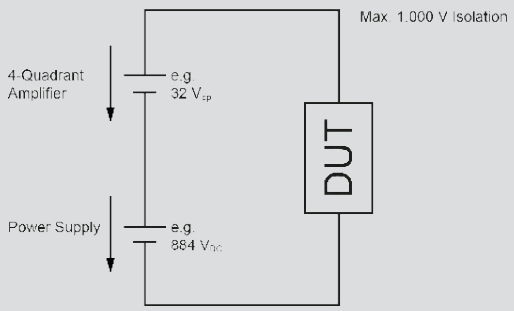
# High Voltage
# Superimposed Alternating Voltage
# LV123 / HV-09

## Serial Operation With Applied Voltage Ripple

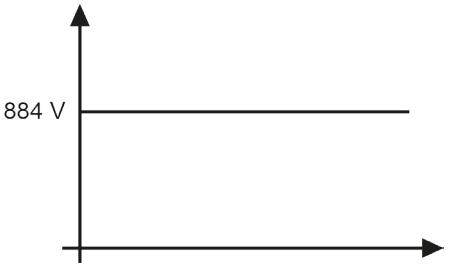
Example:

| | |
|---|---|
| $U_{DC}$ | = 900 V |
| $U_{SS}$ | = 32 $V_{pp}$ |
| f | = 200 kHz |
| I | = Depending on Imax of the SIB 100(-TS) instrument |

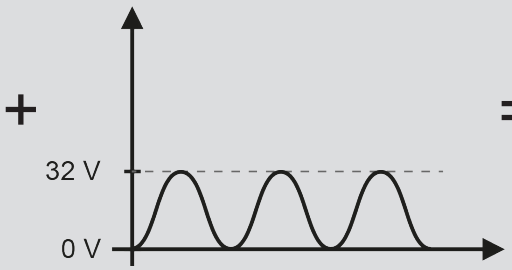
## Our Solution



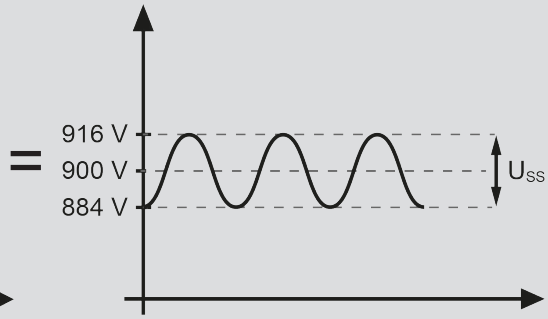

## Power Supply




## 4-Quadrant Amplifier

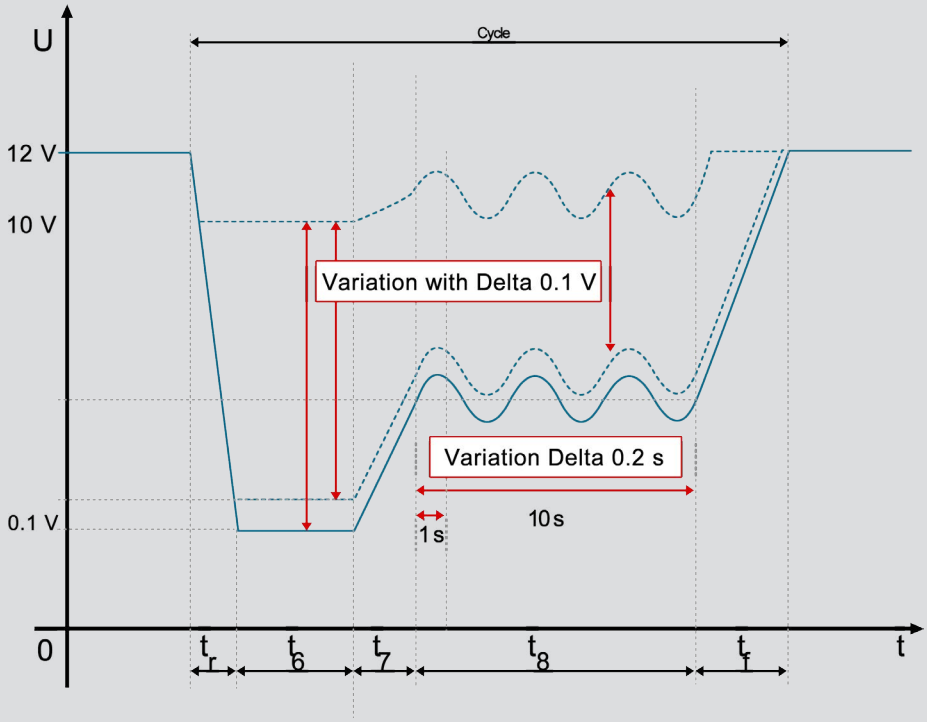



## Power Supply + 4-Quadrant Amplifier



# Variable Waveform Generation

## Variations In Voltage And Time

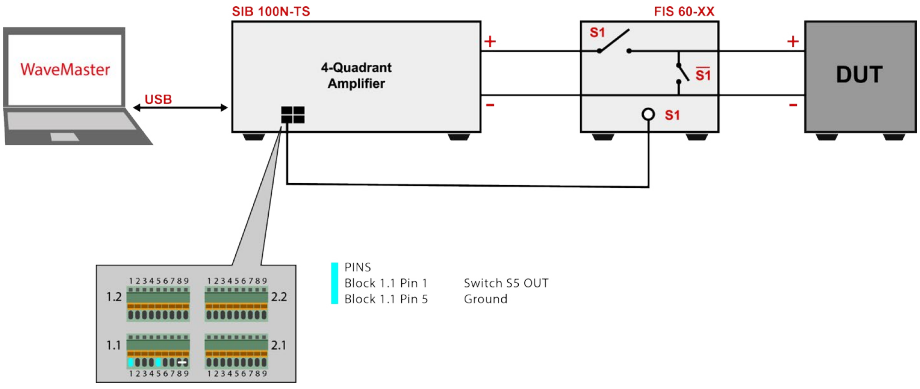



## Easy Definition Of Variations

Meanwhile, many car manufacturers extend the standard waveforms with many variable parameters in time and amplitude.

SIBO´s comprehensive WaveMaster Software allows to do these variations easily.

## Test System With Electronic Switch




## E-10 / E-13 Pulses Out Of LV124

According to LV124, E-10 and E-13 pulses, interruptions need to be implemented. Hereby additional electronic switches are necessary. These switches are controlled by SIBO´s WaveMaster software and the amplifier´s built-in counter outputs.

No additional function generator is necessary. This allows to build up a fully automated HIL test system.

# Easy Programming

## Special Features

- Ready to use for LabView™, Vector CANoe / CAPL, C#, C++, ANSI C, Python, etc.
- Creating waveforms out of source code
- Predefined commands for sine waves, exponential functions, ramps, etc.
- Integration into HIL simulation systems
- Complete interface handling and configuration
- Starting and closing software out of application

## Example 1

This programming example in Python opens an existing data file, loads data into amplifiers memory, switches the output on  and runs the application in a loop of five times.

```
import ArbNetPY27
import time

#Create PYD object
arbnet = ArbNetPY27.CreateObject()
#Connect to the ArbNet server
serverIPAddress = „10.99.92.78“
serverPortNumber = 700
arbnet.Connect(serverIPAddress,serverPortNumber)

#Open an existing file
fileName = „F:\\Waveform1MV.and“
openfileRet = arbnet.OpenFile(fileName)

#Arbitrary System Function
sys=arbnet.GetArbitrarySystem()
#Configure the device settings
#Define source and amplifier
source = „NI DAQ USB-6259“
amplifier = „SIB 105-75E-TS“
#Set System
setSysRet = sys.Set(1,source,amplifier,0,0,0)
time.sleep(5)
#Load waveform into instruments memory
sys.Load()
#Enable output
sys.Execute()
#Start runnings of waveform with burst=5
sys.Start(5)
#Wait until waveform ends after 5 runnings
run = sys.IsRun()
while run == 1:
     time.sleep(0.5)
     run = sys.IsRun()
#Set output to standby
sys.Standby()

#Close file
openfileRet.Close()
#Disconnect from ArbNet server
arbnet.disconnect()
```

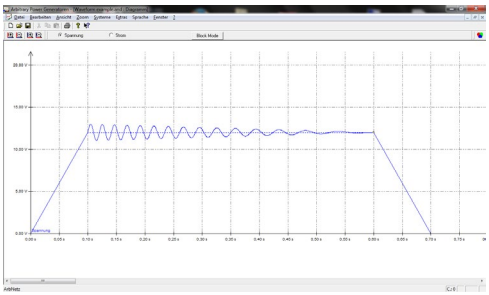
## Example 2

Creating waveforms out of customers programming source code is quite easy:

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using ArbNetzRemoteDotNet;

namespace TestCase2
{
    class Program
    {
        static void Main(string[] args)
        {
            //assuming ArbNetz is started externally in server mode
            RemoteArbNetzDotNet _dllTest = new RemoteArbNetzDotNet();
            Resource _sysResource = null;
            Resource _fileResNew = null;

            string ipaddress = „10.99.92.78“;
            int iport = 700;
            int res = -1;
            int layer = 1;
            string source = „NI DAQ USB-6259“;
            string amplifier = „SIB 105-75E-TS“;
            string online = string.Empty;
            string fileName = „F:\\Waveform2MV.and“;
            int fileType = 0x10;
            int run = 0;

            res = _dllTest.Connect(ipaddress, iport);
            Console.WriteLine(„1 - Connected to ArbNet...“);
            res = _dllTest.NewFile(ref _fileResNew, fileType, fileName);
            if(res == 0)
                Console.WriteLine(„2 - New File created...“);
            res = _dllTest.AddDataFile(_fileResNew,1,0.0,0.0,5.0);
            if(res == 0)
                Console.WriteLine(„ - 1 New value in waveform added...“);
            res = _dllTest.AddDataFile(_fileResNew,1,0.1,12.0,5.0);
            if(res == 0)
                Console.WriteLine(„ - 2 New value in waveform added...“);
            res = _dllTest.AddDataFile(_fileResNew,1,0.5,12.0,5.0,1,50.0,10.0,2.0,0.0,0.0,0);
            if(res == 0)
                Console.WriteLine(„ - 3 Sine interference on waveform added...“);
            res = _dllTest.AddDataFile(_fileResNew,1,1.0,0.0,5.0);
            if(res == 0)
                Console.WriteLine(„ - 4 New value in waveform added...“);
            res = _dllTest.GetArbitrarySystem(out _sysResource);
            if (res == 0)
            {
               Console.WriteLine(„3 - GetArbitrarySystem...“);
               res = _dllTest.SetSystem(_sysResource,ref online,layer,source,amplifier,0,0,0);
               if (res == 0)
               {
                   res = _dllTest.LoadSystem(_sysResource);
                   if (res == 0)
                       Console.WriteLine(„5 - Write Waveform into instruments memory...“);
                   res = _dllTest.ExecuteSystem(_sysResource);
                   if (res == 0)
                       Console.WriteLine(„6 - Switch instruments output on...“);
                   res = _dllTest.StartSystem(_sysResource, 5);
                   if (res == 0)
                       Console.WriteLine(„7 - Run waveform 5 times...“);
                   res = _dllTest.IsRunSystem(_sysResource, out run);
                   if (res == 0)
                       Console.WriteLine(„8 - IsRunSystem...“);
                   while (run == 1)
                   {
                       System.Threading.Thread.Sleep(1000);//1 sec
                       res = _dllTest.IsRunSystem(_sysResource, out run);
                   }
                   res = _dllTest.StandbySystem(_sysResource);
                   if (res == 0)
                       Console.WriteLine(„9 - StandbySystem...“);
               }
            }
            res = _dllTest.SaveFile(_fileResNew,fileName);
            res = _dllTest.CloseFile(_fileResNew);
            res = _dllTest.Disconnect();
        }
    }
}
```

## Example 2 As Graphic Waveform

This code in C# generates the following waveform and runs it 5 times.



# Technical Data / Order Information SIB 100-35N-TS

## Technical Specifications

| SIB | 104-35N-TS | 110-35N-TS | 120-35N-TS | 130-35N-TS | 140-35N-TS | 150-35N-TS |
|---|---|---|---|---|---|---|
| Voltage range | 35 V / -16 V | | | | | |
| Current range | 20 A | 40 A | 76 A | 114 A | 152 A | 190 A |
| Current peak 5 ms | 50 A | 100 A | 190 A | 290 A | 380 A | 480 A |
| Current peak 500 ms / 1 s | on demand | | | | | |
| Source power | 400 W | 1.000 W | 2.000 W | 3.000 W | 4.000 W | 5.000 W |
| Sink power | 175 W | 450 W | 900 W | 1.350 W | 1.800 W | 2.250 W |
| Slew rate | 100 V / µs | | | | | |
| V mode<br>Frequency<br>full range<br>small signal (-3 dB)<br>CC mode<br>Frequency<br>full range<br>small signal (-3 dB) | DC - 200 kHz<br>DC - 1 MHz<br><br>Depending on RC network | | | | | |
| Input impedance<br>unbalanced, 1 kHz<br>balanced, 1 kHz | 100 k Ω<br>200 k Ω | | | | | |
| Instrument size | 19“, 3 U | 19“, 4 U | 19“, 14 U | 19“, 18 U | 19“, 22 U | 19“, 26 U |
| Delivery | Instrument | Instrument | 19“ rack | 19“ rack | 19“ rack | 19“ rack |
| Operating temperature | 10° C - 55° C | | | | | |

## Order Information

| | |
|---|---|
| SIB 104-35N-TS | 35 V / 20 A / 0,4 kW |
| SIB 110-35N-TS | 35 V / 40 A / 1 kW |
| SIB 120-35N-TS | 35 V / 76 A / 2 kW |
| SIB 130-35N-TS | 35 V / 114 A / 3 kW |
| SIB 140-35N-TS | 35 V / 152 A / 4 kW |
| SIB 150-35N-TS | 35 V / 190 A / 5 kW |
| SIB 160-35N-TS | 35 V / 228 A / 6 kW |
| SIB 180-35N-TS | 35 V / 304 A / 8 kW |
| SIB 200-35N-TS | 35 V / 380 A / 10 kW |
| SIB 220-35N-TS | 35 V / 456 A / 12 kW |
| SIB 250-35N-TS | 35 V / 570 A / 15 kW |
| SIB 280-35N-TS | 35 V / 684 A / 18 kW |

## Technical Specifications

| SIB | 160-35N-TS | 180-35N-TS | 200-35N-TS | 220-35N-TS | 250-35N-TS | 280-35N-TS |
|---|---|---|---|---|---|---|
| Voltage range | 35 V / -16 V | | | | | |
| Current range | 228 A | 304 A | 380 A | 456 A | 570 A | 684 A |
| Current peak 5 ms | 570 A | 760 A | 950 A | 1.140 A | 1.430 A | 1.710 A |
| Current peak 500 ms / 1 s | on demand | | | | | |
| Source power | 6.000 W | 8.000 W | 10.000 W | 12.000 W | 15.000 W | 18.000 W |
| Sink power | 2.700 W | 3.500 W | 4.400 W | 5.300W | 6.600 W | 7.900 W |
| Slew rate | 100 V / µs | | | | | |
| V mode<br>Frequency<br>full range<br>small signal (-3 dB)<br>CC mode<br>Frequency<br>full range<br>small signal (-3 dB) | DC - 200 kHz<br>DC - 1 MHz<br><br>Depending on<br>RC network | | | | | |
| Input impedance<br>unbalanced, 1 kHz<br>balanced, 1 kHz | 100 k Ω<br>200 k Ω | | | | | |
| Instrument size | 19“, 30 U | 2x 19“, 22 U | 2 x 19“, 26 U | 2 x 19“, 30 U | 3 x 19“, 26 U | 3 x 19“, 30 U |
| Delivery | 19“ rack | 2 x 19“ rack | 2 x 19“ rack | 2 x 19“ rack | 3 x 19“ rack | 3 x 19“ rack |
| Operating temperature | 10° C - 55° C | | | | | |

## Options

SIB 100S Sensing (0 V / 0,5 V / 1 V / 2 V)
SIB 100I3 3-channel isolation amplifier
SIB 100CS200 Current sensor
SIB 700-XX 19” rack
SIB 100K Compensation network

FIS 60-11 Electronic switch (60 V / 11 A)
FIS 60-125 Electronic switch (60 V / 125 A)
Pro f8 Tube analyzer (8 analogue inputs)
Pro f24 Tube analyzer (20 analogue inputs / 4 PWM channels)
Pro f96 Tube analyzer (64 analogue inputs / 32 PWM channels)

## Scope Of Supply

1 Amplifier

1 Power cord

1 User manual

1 WaveMaster software

1 WaveMaster remote DLL´s

1 Waveform library

1 19” rack (systems greater than 1.000 W)

# Technical Data / Order Information SIB 100-70N-TS

## Technical Specifications

| SIB | 105-70N-TS | 110-70N-TS | 120-70N-TS | 130-70N-TS | 140-70N-TS | 150-70N-TS |
|---|---|---|---|---|---|---|
| Voltage range | 70 V / -16 V | | | | | |
| Current range | 15 A | 40 A | 76 A | 114 A | 152 A | 190 A |
| Current peak 5 ms | 40 A | 100 A | 190 A | 290 A | 380 A | 480 A |
| Current peak 500 ms / 1 s | on demand | | | | | |
| Source power | 500 W | 1.000 W | 2.000 W | 3.000 W | 4.000 W | 5.000 W |
| Sink power | 220 W | 450 W | 900 W | 1.350 W | 1.800 W | 2.250 W |
| Slew rate | 100 V / µs | | | | | |
| V mode<br>Frequency<br>full range<br>small signal (-3 dB)<br>CC mode<br>Frequency<br>full range<br>small signal (-3 dB) | DC - 200 kHz<br>DC - 1 MHz<br><br>Depending on<br>RC network | | | | | |
| Input impedance<br>unbalanced, 1 kHz<br>balanced, 1 kHz | 100 k Ω<br>200 k Ω | | | | | |
| Instrument size | 19“, 3 U | 19“, 4 U | 19“, 14 U | 19“, 18 U | 19“, 22 U | 19“, 26 U |
| Delivery | Instrument | Instrument | 19“ rack | 19“ rack | 19“ rack | 19“ rack |
| Operating temperature | 10° C - 55° C | | | | | |

## Order Information

| | |
|---|---|
| SIB 105-70N-TS | 70 V / 15 A / 0,5 kW |
| SIB 110-70N-TS | 70 V / 40 A / 1 kW |
| SIB 120-70N-TS | 70 V / 76 A / 2 kW |
| SIB 130-70N-TS | 70 V / 114 A / 3 kW |
| SIB 140-70N-TS | 70 V / 152 A / 4 kW |
| SIB 150-70N-TS | 70 V / 190 A / 5 kW |
| SIB 160-70N-TS | 70 V / 228 A / 6 kW |
| SIB 180-70N-TS | 70 V / 304 A / 8 kW |
| SIB 200-70N-TS | 70 V / 380 A / 10 kW |
| SIB 220-70N-TS | 70 V / 456 A / 12 kW |
| SIB 250-70N-TS | 70 V / 570 A / 15 kW |
| SIB 280-70N-TS | 70 V / 684 A / 18 kW |

## Technical Specifications

| SIB | 160-70N-TS | 180-70N-TS | 200-70N-TS | 220-70N-TS | 250-70N-TS | 280-70N-TS |
|---|---|---|---|---|---|---|
| Voltage range | 70 V / -16 V | | | | | |
| Current range | 228 A | 304 A | 380 A | 456 A | 570 A | 684 A |
| Current peak 5 ms | 570 A | 760 A | 950 A | 1.140 A | 1.430 A | 1.710 A |
| Current peak 500 ms / 1 s | on demand | | | | | |
| Source power | 6.000 W | 8.000 W | 10.000 W | 12.000 W | 15.000 W | 18.000 W |
| Sink power | 2.700 W | 3.500 W | 4.400 W | 5.300W | 6.600 W | 7.900 W |
| Slew rate | 100 V / µs | | | | | |
| V mode<br>Frequency<br>full range<br>small signal (-3 dB)<br>CC mode<br>Frequency<br>full range<br>small signal (-3 dB) | DC - 200 kHz<br>DC - 1 MHz<br>Depending on RC network | | | | | |
| Input impedance<br>unbalanced, 1 kHz<br>balanced, 1 kHz | 100 k Ω<br>200 k Ω | | | | | |
| Instrument size | 19“, 30 U | 2x 19“, 22 U | 2 x 19“, 26 U | 2 x 19“, 30 U | 3 x 19“, 26 U | 3 x 19“, 30 U |
| Delivery | 19“ rack | 2 x 19“ rack | 2 x 19“ rack | 2 x 19“ rack | 3 x 19“ rack | 3 x 19“ rack |
| Operating temperature | 10° C - 55° C | | | | | |

## Options

SIB 100S Sensing (0 V / 0,5 V / 1 V / 2 V)
SIB 100I3 3-channel isolation amplifier
SIB 100CS200 Current sensor
SIB 700-XX 19” rack
SIB 100K Compensation network

FIS 60-11 Electronic switch (60 V / 11 A)
FIS 60-125 Electronic switch (60 V / 125 A)
Pro f8 Tube analyzer (8 analogue inputs)
Pro f24 Tube analyzer (20 analogue inputs / 4 PWM channels)
Pro f96 Tube analyzer (64 analogue inputs / 32 PWM channels)

## Scope Of Supply

1 Amplifier

1 Power cord

1 User manual

1 WaveMaster software

1 WaveMaster remote DLL´s

1 Waveform library

1 19” rack (systems greater than 1.000 W)

# Technical Data / Order Information SIB 100-75N-TS

## Technical Specifications

| SIB | 105-75N-TS | 110-75N-TS | 120-75N-TS | 130-75N-TS | 140-75N-TS | 150-75N-TS |
|---|---|---|---|---|---|---|
| Voltage range | 75 V / -75 V | | | | | |
| Current range | 11 A | 40 A | 76 A | 114 A | 152 A | 190 A |
| Current peak 5 ms | 30 A | 100 A | 190 A | 290 A | 380 A | 480 A |
| Current peak 500 ms / 1 s | on demand | | | | | |
| Source power | 500 W | 1.000 W | 2.000 W | 3.000 W | 4.000 W | 5.000 W |
| Sink power | 150 W | 375 W | 750 W | 1.125 W | 1.500 W | 1.875 W |
| Slew rate | 100 V / µs | | | | | |
| V mode<br>Frequency<br>full range<br>small signal (-3 dB)<br>CC mode<br>Frequency<br>full range<br>small signal (-3 dB) | DC - 200 kHz<br>DC - 1 MHz<br><br>Depending on<br>RC network | | | | | |
| Input impedance<br>unbalanced, 1 kHz<br>balanced, 1 kHz | 100 k Ω<br>200 k Ω | | | | | |
| Instrument size | 19“, 3 U | 19“, 4 U | 19“, 14 U | 19“, 18 U | 19“, 22 U | 19“, 26 U |
| Delivery | Instrument | Instrument | 19“ rack | 19“ rack | 19“ rack | 19“ rack |
| Operating temperature | 10° C - 55° C | | | | | |

## Order Information

| | |
|---|---|
| SIB 105-75N-TS | 75 V / 11 A / 0,5 kW |
| SIB 110-75N-TS | 75 V / 40 A / 1 kW |
| SIB 120-75N-TS | 75 V / 76 A / 2 kW |
| SIB 130-75N-TS | 75 V / 114 A / 3 kW |
| SIB 140-75N-TS | 75 V / 152 A / 4 kW |
| SIB 150-75N-TS | 75 V / 190 A / 5 kW |
| SIB 160-75N-TS | 75 V / 228 A / 6 kW |
| SIB 180-75N-TS | 75 V / 304 A / 8 kW |
| SIB 200-75N-TS | 75 V / 380 A / 10 kW |
| SIB 220-75N-TS | 75 V / 456 A / 12 kW |
| SIB 250-75N-TS | 75 V / 570 A / 15 kW |
| SIB 280-75N-TS | 75 V / 684 A / 18 kW |

SIBO

## Technical Specifications

| SIB | 160-75N-TS | 180-75N-TS | 200-75N-TS | 220-75N-TS | 250-75N-TS | 280-75N-TS |
|---|---|---|---|---|---|---|
| Voltage range | 75 V / -75 V | | | | | |
| Current range | 228 A | 304 A | 380 A | 456 A | 570 A | 684 A |
| Current peak 5 ms | 570 A | 760 A | 950 A | 1.140 A | 1.430 A | 1.710 A |
| Current peak 500 ms / 1 s | on demand | | | | | |
| Source power | 6.000 W | 8.000 W | 10.000 W | 12.000 W | 15.000 W | 18.000 W |
| Sink power | 2.225 W | 2.975 W | 3.725 W | 4.475 W | 5.587 W | 6.710 W |
| Slew rate | 100 V / µs | | | | | |
| V mode<br>Frequency<br>full range<br>small signal (-3 dB)<br>CC mode<br>Frequency<br>full range<br>small signal (-3 dB) | DC - 200 kHz<br>DC - 1 MHz<br>Depending on<br>RC network | | | | | |
| Input impedance<br>unbalanced, 1 kHz<br>balanced, 1 kHz | 100 k Ω<br>200 k Ω | | | | | |
| Instrument size | 19“, 30 U | 2x 19“, 22 U | 2 x 19“, 26 U | 2 x 19“, 30 U | 3 x 19“, 26 U | 3 x 19“, 30 U |
| Delivery | 19“ rack | 2 x 19“ rack | 2 x 19“ rack | 2 x 19“ rack | 3 x 19“ rack | 3 x 19“ rack |
| Operating temperature | 10° C - 55° C | | | | | |

## Options

| | |
|---|---|
| SIB 100S | Sensing (0 V / 0,5 V / 1 V / 2 V) |
| SIB 100I3 | 3-channel isolation amplifier |
| SIB 100CS200 | Current sensor |
| SIB 700-XX | 19” rack |
| SIB 100K | Compensation network |
| FIS 60-11 | Electronic switch (60 V / 11 A) |
| FIS 60-125 | Electronic switch (60 V / 125 A) |
| Pro f8 | Tube analyzer (8 analogue inputs) |
| Pro f24 | Tube analyzer (20 analogue inputs / 4 PWM channels) |
| Pro f96 | Tube analyzer (64 analogue inputs / 32 PWM channels) |

## Scope Of Supply

1 Amplifier

1 Power cord

1 User manual

1 WaveMaster software

1 WaveMaster remote DLL´s

1 Waveform library

1 19” rack (systems greater than 1.000 W)

SIBO

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