TARFALA RESEARCH STATION

Tarfala Research Station automatic weather station, 1997

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MONITORING REPORT

April 12, 2016

Contents

1 Instrumentation

The TRS met station consisted of the following instruments during 1997

Sensor	Serial number	Remark
Pt100		in Stevenson screen
Pt100		in Young screen
T/Rh		at 2 m
Young Wind Monitor		at 3 m
LiCor Li-200SB pyranometer		at 2 m
Tipping bucket precipitation gauge		at 2 m
SR-50		at 2.45 m
CR10 data logger		

2 Notes on the station data

- Some original logger files are missing and existing data files are based on processed data. Raw logger data stops on day 218 2100.
- Precipitation data is not recorded during 1997(!)
- Wind sensor seems to suffer rhiming during December. This may affect more than the periods of no data.
- No complete 'synoptic' data set created since
- Snow depth sensor appears to be removed after 1997-05-06 12:00:00. Data from this point until end of season is the sensor to ground constant of $2.45\,\mathrm{m}$.

3 Data coverage

- Radiation data missing from
  1997-06-17 04:00:00 to 1997-07-18 13:00:00
  1997-07-24 07:00:00 to 1997-07-26 15:00:00
  1997-08-12 22:00:00 to 1997-09-17 21:00:00

- Wind data missing from
  1997-12-25 21:00:00 to 1997-12-29 18:00:00 (probably rhimed sensor)
  1997-12-09 02:00:00 to 1997-12-14 18:00:00 (probably rhimed sensor)

- Data missing from daily values 1997-06-17 04:00:00 to 1997-07-18 13:00:00 (radiation)
  1997-07-24 07:00:00 to 1997-07-26 15:00:00(radiation)
  1997-08-12 22:00:00 to 1997-09-17 21:00:00(radiation)
  1997-06-18 00:00:00 to 1997-07-19 00:00:00 (radaition)
  1997-07-25 00:00:00 to 1997-07-27 00:00:00 (radiation)
  1997-08-13 00:00:00 to 1997-09-18 00:00:00 (radiation)
  1997-12-10 00:00:00 to 1997-12-14 00:00:00 (Wind data)
  1997-12-27 00:00:00 to 1997-12-29 00:00:00 (Wind data)

4 Notes on data storage

Example of hourly data:
`101,1997,7,4,185,1300,7.82,7.9,7.85,99.6,2.087,324.3,0,NaN,2.45,2.45`

Column	Example data	Description
01:	101	ID
02:	1997	Year
03:	7	Month of Year
04:	4	Day of Month
05:	185	Day of Year
06:	1300	hour-minute (hhmm)
07:	7.82	2 Pt100 T in Stevenson screen)
08:	7.9	3 T in Young screen
09:	7.85	4 Pt100 in new Young screen
10:	99.6	5 Rh in Young screen
11:	2.087	6 Mean horizontal wind speed
12:	324.3	7 resultant mean wind direction
13:	0	8 Standard deviation of wind direction
14:	NaN	9 Global radiation
15:	2.45	11 SR50 average snow depth
16:	s.45	12 SR50 transient snow depth

Example of daily data summaries:
`1997,185,2400,7.84,8.05,7.88,100,10.47,610,5.628,229,4.743,543,2.006,336.7,-999,2.45,2.45,13.91`

Column	Example data	Description
01:	1997	Year
02:	185	Day of Year
03:	2400	hour-minute (hhmm)
04:	7.84	2 Daily average T in Stevenson screen)
05:	8.05	3 Daily T from T/Rh in Young screen
06:	7.88	4 Daily T from T/Rh in Young screen
07:	100	5 daily average humidity in Young screen
08:	10.47	6 Daily maximum temperature in Young screen
09:	610	7 hhmm for maximum daily temperature
10:	5.628	8 Daily minimum temperature in Young screen
11:	229	9 hhmm for minimum daily temperature
12:	4.793	10 Maximum wind speed
13:	543	11 hhmm for maximum wind speed
14:	2.006	12 Average wind speed
15:	336.7	13 Average wind direction
16:	NaN	14 Incoming radiation
17:	2.45	15 SR50 average snow depth
18:	2.45	16 SR50 transient snow depth
19:	13.93	17 Battery voltage

5 Data files and content

`TRSmet1997.csv` Raw data file

`TRS_met_1997_Radiation.csv`
Date-time, Global radiation
`1997-01-01 01:00:00,-14.65`

`TRS_met_1997_Relative_humidity.csv`
Date-time, hourly average Rh
`1997-01-01 01:00:00,58.9`

`TRS_met_1997_Snow_depth.csv`
Date-time, Average snow depth, sample snow depth
`1997-01-01 01:00:00,0.832,0.831`

`TRS_met_1997_Temperature.csv`
Date-time, hourly average T (Stevenson), hourly average T (Young), hourly average T/Rh (Young)
`1997-01-01 01:00:00,-11.99,-11.88,-11.68`

`TRS_met_1997_Wind.csv`
Date-time, Mean horizontal wind speed, resultant mean wind direction
`1997-01-01 01:00:00,0.7,297.0,0.136`

`TRS_met_1997_Daily_data.csv`
Data columns follows description above
`1997-01-02 00:00:00,-9.63,-9.48,-9.38,53.5,-7.08,1317,-12.20,2236,2.2,644,0.7,`
`296.0,-14.2,0.82,0.82,13.93`

The data collected during 1997 is summarized the figure 1 and Table 1.

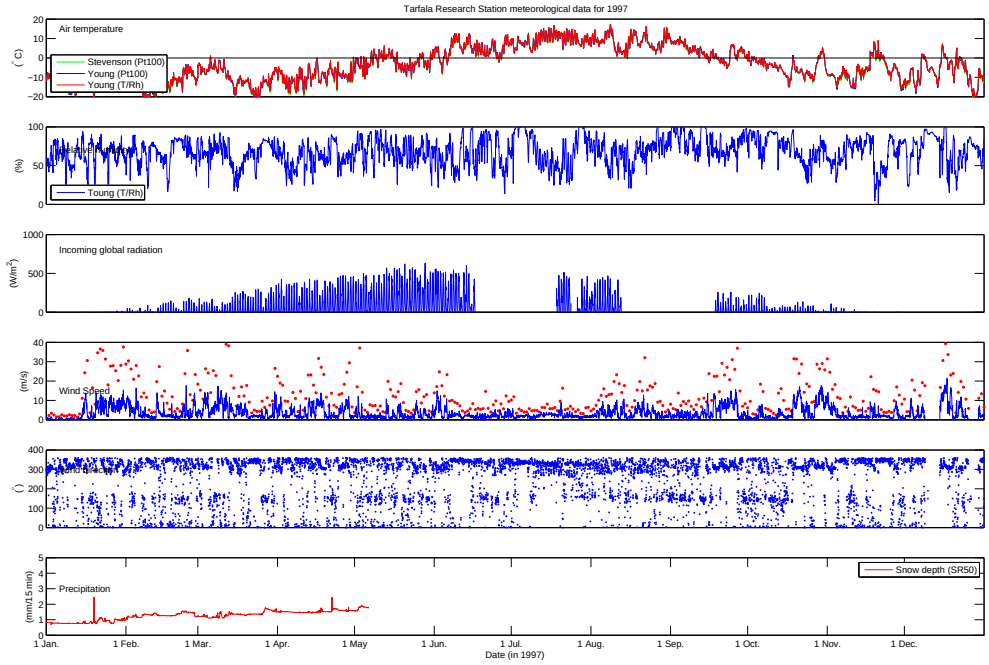

Figure. 1. Summary of meteorological data from Tarfala Research Station automatic weather station 1997.

Table. 1. Monthly averages of meteorological parameters from the Tarfala Research Station automatic weather station 1997.

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Average air temperature (Stevenson)												
(°C)	−9.9	−12.2	−10.6	−9.7	−2.1	4.4	9.3	8.2	3.2	−4.7	−7.1	−7.7
n	743	671	767	744	743	743	743	767	743	767	743	768
Average air temperature (Young)												
(°C)	−9.7	−11.9	−10.4	−9.5	−2.1	4.7	9.4	8.3	3.3	−4.6	−6.7	−7.4
n	743	671	767	744	743	743	743	767	743	767	743	768
Average air temperature												
(°C)	−9.6	−11.8	−10.2	−9.3	−2.0	4.6	9.3	8.2	3.2	−4.5	−6.7	−7.3
n	743	671	767	744	743	743	743	767	743	767	743	768
Positive degree sum												
(°C)	4	0	2	0	407	3644	7000	6384	2758	158	312	193
n	12	0	4	1	217	662	743	764	585	98	121	96
Average relative humidity												
(%)	64.2	66.5	65.5	60.5	70.2	63.4	70.8	67.8	79.9	73.9	64.9	70.3
n	743	671	767	744	743	743	743	767	743	767	743	768
Average incoming global radiation												
($\mathrm{W\,m^{-2}}$)	−12.9	−0.4	34.2	102.1	157.5	163.1	108.9	92.3	22.7	5.7	−11.1	−14.0
n	743	671	767	744	743	412	265	309	314	767	743	768
Global incoming energy sum												
($\mathrm{W\,m^{-2}}$)	111	6634	32102	79952	119166	67941	–	29746	–	11641	850	0
n	20	144	320	426	542	315	–	201	–	226	53	0
Average wind speed												
($\mathrm{m\,s^{-1}}$)	3.8	3.9	4.7	4.2	2.5	2.7	2.1	3.4	4.1	4.4	2.9	4.9
n	743	671	767	744	743	743	743	767	743	767	743	541

Logger program

5.1 Program valid until 17 January

```
;{CR10}
*Table 1 Program
  01: 10.0000   Execution Interval (seconds)

1:  Batt Voltage (P10)
 1: 10         Loc [ Batteri_V ]

2:  If (X<=>F) (P89)
 1: 10         X Loc [ Batteri_V ]
 2: 4          <
 3: 9.7        F
 4: 0          Go to end of Program Table

3:  3W Half Bridge (P7)
 1: 1          Reps
 2: 33         25 mV 50 Hz Rejection Range
 3: 1          SE Channel
 4: 1          Excite all reps w/Exchan 1
 5: 2100       mV Excitation
 6: 21         Loc [ Rs_Ro_T1  ]
 7: 100        Mult
 8: 0.0000     Offset

4:  3W Half Bridge (P7)
 1: 1          Reps
 2: 33         25 mV 50 Hz Rejection Range
 3: 3          SE Channel
 4: 2          Excite all reps w/Exchan 2
 5: 2100       mV Excitation
 6: 22         Loc [ Rs_Ro_T2  ]
 7: 100.00     Mult
 8: 0.0000     Offset

5:  Temperature RTD (P16)
 1: 2          Reps
 2: 21         R/R0 Loc [ Rs_Ro_T1  ]
 3: 1          Loc [ T1_bur__C ]
 4: 1          Mult
 5: 0.0000     Offset

6:  Do (P86)
 1: 41         Set Port 1 High

7:  Volt (Diff) (P2)
 1: 2          Reps
 2: 35         2500 mV 50 Hz Rejection Range
 3: 3          DIFF Channel
 4: 3          Loc [ T3_Rot__C ]
 5: 0.1        Mult
 6: 0.0000     Offset

8:  Pulse (P3)
 1: 1          Reps
 2: 1          Pulse Input Channel
 3: 21         Low Level AC, Output Hz
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```
 4: 5        Loc [ Vhast_m_s ]
 5: 0.0098   Mult
 6: 0        Offset

9:  Excite-Delay (SE) (P4)
 1: 1        Reps
 2: 5        2500 mV Slow Range
 3: 9        SE Channel
 4: 3        Excite all reps w/Exchan 3
 5: 2        Delay (0.01 sec units)
 6: 2500     mV Excitation
 7: 6        Loc [ Vrikt____ ]
 8: 0.142    Mult
 9: -135     Offset

10:  If (X<=>F) (P89)
 1: 6        X Loc [ Vrikt____ ]
 2: 4        <
 3: 0        F
 4: 30       Then Do

11:  Z=X+F (P34)
 1: 6        X Loc [ Vrikt____ ]
 2: 360      F
 3: 6        Z Loc [ Vrikt____ ]

12:  End (P95)

13:  Volt (SE) (P1)
 1: 1        Reps
 2: 33       25 mV 50 Hz Rejection Range
 3: 10       SE Channel
 4: 7        Loc [ Sol__W_m_ ]
 5: 116.55   Mult
 6: 0.0000   Offset

14:  Internal Temperature (P17)
 1: 9        Loc [ Logtemp_C ]

15:  Do (P86)
 1: 42       Set Port 2 High

16:  Excitation with Delay (P22)
 1: 1        Ex Channel
 2: 1        Delay W/Ex (0.01 sec units)
 3: 0        Delay After Ex (0.01 sec units)
 4: 1        mV Excitation

17:  Do (P86)
 1: 52       Set Port 2 Low

18:  Pulse (P3)
 1: 1        Reps
 2: 2        Pulse Input Channel
 3: 0        High Frequency, All Counts
 4: 23       Loc [ Avstand_m ]
 5: -.0025   Mult
 6: 0.0000   Offset
```

```
19:  Z=X+F (P34)
 1: 2        X Loc [ T2_skyd_C ]
 2: 273.15   F
 3: 24       Z Loc [ T_SR50__K ]

20:  Z=F x 10^n (P30)
 1: 273.15   F
 2: 0        n, Exponent of 10
 3: 25       Z Loc [ Ref_Temp_ ]

21:  Z=X/Y (P38)
 1: 24       X Loc [ T_SR50__K ]
 2: 25       Y Loc [ Ref_Temp_ ]
 3: 26       Z Loc [ Mult_     ]

22:  Z=SQRT(X) (P39)
 1: 26       X Loc [ Mult_     ]
 2: 26       Z Loc [ Mult_     ]

23:  Z=X*Y (P36)
 1: 23       X Loc [ Avstand_m ]
 2: 26       Y Loc [ Mult_     ]
 3: 23       Z Loc [ Avstand_m ]

24:  Z=X+F (P34)
 1: 23       X Loc [ Avstand_m ]
 2: 2.45     F
 3: 11       Z Loc [ Snodjup_m ]

25:  If time is (P92)
 1: 0        Minutes (Seconds --) into a
 2: 60       Interval (same units as above)
 3: 10       Set Output Flag High

26:  Set Active Storage Area (P80)
 1: 1        Final Storage Area 1
 2: 101      Array ID

27:  Real Time (P77)
 1: 1220     Year,Day,Hour/Minute (midnight = 2400)

28:  Average (P71)
 1: 4        Reps
 2: 1        Loc [ T1_bur__C ]

29:  Wind Vector (P69)
 1: 1        Reps
 2: 1        Samples per Sub-Interval
 3: 0        S, é1, & å(é1) Polar
 4: 5        Wind Speed/East Loc [ Vhast_m_s ]
 5: 6        Wind Direction/North Loc [ Vrikt____ ]

30:  Average (P71)
 1: 1        Reps
 2: 7        Loc [ Sol__W_m_ ]

31:  Average (P71)
```

```
 1: 1        Reps
 2: 11       Loc [ Snodjup_m ]

32:  Sample (P70)
 1: 1        Reps
 2: 11       Loc [ Snodjup_m ]

33:  Serial Out (P96)
 1: 71       Storage Module

34:  If time is (P92)
 1: 0        Minutes (Seconds --) into a
 2: 1440     Interval (same units as above)
 3: 10       Set Output Flag High

35:  Set Active Storage Area (P80)
 1: 1        Final Storage Area 1
 2: 124      Array ID

36:  Real Time (P77)
 1: 1220     Year,Day,Hour/Minute (midnight = 2400)

37:  Average (P71)
 1: 4        Reps
 2: 1        Loc [ T1_bur__C ]

38:  Maximum (P73)
 1: 1        Reps
 2: 10       Value with Hr-Min
 3: 2        Loc [ T2_skyd_C ]

39:  Minimum (P74)
 1: 1        Reps
 2: 10       Value with Hr-Min
 3: 2        Loc [ T2_skyd_C ]

40:  Maximum (P73)
 1: 1        Reps
 2: 10       Value with Hr-Min
 3: 5        Loc [ Vhast_m_s ]

41:  Wind Vector (P69)
 1: 1        Reps
 2: 1        Samples per Sub-Interval
 3: 1        S, é1 Polar
 4: 5        Wind Speed/East Loc [ Vhast_m_s ]
 5: 6        Wind Direction/North Loc [ Vrikt____ ]

42:  Average (P71)
 1: 1        Reps
 2: 7        Loc [ Sol__W_m_ ]

43:  Average (P71)
 1: 1        Reps
 2: 11       Loc [ Snodjup_m ]

44:  Sample (P70)
 1: 1        Reps
```

```
 2: 11       Loc [ Snodjup_m ]

45:  Sample (P70)
 1: 1        Reps
 2: 10       Loc [ Batteri_V ]

46:  Serial Out (P96)
 1: 71       Storage Module

47:  If time is (P92)
 1: 60       Minutes (Seconds --) into a
 2: 1440     Interval (same units as above)
 3: 10       Set Output Flag High

48:  Set Active Storage Area (P80)
 1: 1        Final Storage Area 1
 2: 103      Array ID

49:  Real Time (P77)
 1: 1220     Year,Day,Hour/Minute (midnight = 2400)

50:  Sample (P70)
 1: 1        Reps
 2: 2        Loc [ T2_skyd_C ]

51:  If time is (P92)
 1: 240      Minutes (Seconds --) into a
 2: 1440     Interval (same units as above)
 3: 10       Set Output Flag High

52:  Set Active Storage Area (P80)
 1: 1        Final Storage Area 1
 2: 103      Array ID

53:  Real Time (P77)
 1: 1220     Year,Day,Hour/Minute (midnight = 2400)

54:  Sample (P70)
 1: 1        Reps
 2: 2        Loc [ T2_skyd_C ]

55:  If time is (P92)
 1: 420      Minutes (Seconds --) into a
 2: 1440     Interval (same units as above)
 3: 10       Set Output Flag High

56:  Set Active Storage Area (P80)
 1: 1        Final Storage Area 1
 2: 103      Array ID

57:  Real Time (P77)
 1: 1220     Year,Day,Hour/Minute (midnight = 2400)

58:  Sample (P70)
 1: 1        Reps
 2: 2        Loc [ T2_skyd_C ]

59:  If time is (P92)
```

```
 1: 600      Minutes (Seconds --) into a
 2: 1440     Interval (same units as above)
 3: 10       Set Output Flag High

60:  Set Active Storage Area (P80)
 1: 1        Final Storage Area 1
 2: 103      Array ID

61:  Real Time (P77)
 1: 1220     Year,Day,Hour/Minute (midnight = 2400)

62:  Sample (P70)
 1: 1        Reps
 2: 2        Loc [ T2_skyd_C ]

63:  If time is (P92)
 1: 780      Minutes (Seconds --) into a
 2: 1440     Interval (same units as above)
 3: 10       Set Output Flag High

64:  Set Active Storage Area (P80)
 1: 1        Final Storage Area 1
 2: 103      Array ID

65:  Real Time (P77)
 1: 1220     Year,Day,Hour/Minute (midnight = 2400)

66:  Sample (P70)
 1: 1        Reps
 2: 2        Loc [ T2_skyd_C ]

67:  If time is (P92)
 1: 960      Minutes (Seconds --) into a
 2: 1440     Interval (same units as above)
 3: 10       Set Output Flag High

68:  Set Active Storage Area (P80)
 1: 1        Final Storage Area 1
 2: 103      Array ID

69:  Real Time (P77)
 1: 1220     Year,Day,Hour/Minute (midnight = 2400)

70:  Sample (P70)
 1: 1        Reps
 2: 2        Loc [ T2_skyd_C ]

71:  If time is (P92)
 1: 1140     Minutes (Seconds --) into a
 2: 1440     Interval (same units as above)
 3: 10       Set Output Flag High

72:  Set Active Storage Area (P80)
 1: 1        Final Storage Area 1
 2: 103      Array ID

73:  Real Time (P77)
 1: 1220     Year,Day,Hour/Minute (midnight = 2400)
```

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74:  Sample (P70)
 1: 1        Reps
 2: 2        Loc [ T2_skyd_C ]

75:  If time is (P92)
 1: 1320     Minutes (Seconds --) into a
 2: 1440     Interval (same units as above)
 3: 10       Set Output Flag High

76:  Set Active Storage Area (P80)
 1: 1        Final Storage Area 1
 2: 103      Array ID

77:  Real Time (P77)
 1: 1220     Year,Day,Hour/Minute (midnight = 2400)

78:  Sample (P70)
 1: 1        Reps
 2: 2        Loc [ T2_skyd_C ]

*Table 2 Program
  01: 0.0000    Execution Interval (seconds)

1:  Do (P86)
 1: 42       Set Port 2 High

2:  Excitation with Delay (P22)
 1: 1        Ex Channel
 2: 1        Delay W/Ex (0.01 sec units)
 3: 0        Delay After Ex (0.01 sec units)
 4: .0000    mV Excitation

3:  Do (P86)
 1: 52       Set Port 2 Low

4:  Pulse (P3)
 1: 1        Reps
 2: 2        Pulse Input Channel
 3: 0        High Frequency, All Counts
 4: 23       Loc [ Avstand_m ]
 5: -.0025   Mult
 6: 0.0000   Offset

5:  Z=X+F (P34)
 1: 2        X Loc [ T2_skyd_C ]
 2: 273.15   F
 3: 24       Z Loc [ T_SR50__K ]

6:  Z=F x 10^n (P30)
 1: 273.15   F
 2: 0        n, Exponent of 10
 3: 25       Z Loc [ Ref_Temp_ ]

7:  Z=X/Y (P38)
 1: 24       X Loc [ T_SR50__K ]
 2: 25       Y Loc [ Ref_Temp_ ]
 3: 26       Z Loc [ Mult_     ]
```

```
8:  Z=SQRT(X) (P39)
 1: 26       X Loc [ Mult_     ]
 2: 26       Z Loc [ Mult_     ]

9:  Z=X*Y (P36)
 1: 23       X Loc [ Avstand_m ]
 2: 26       Y Loc [ Mult_     ]
 3: 23       Z Loc [ Avstand_m ]

10:  Z=X+F (P34)
 1: 23       X Loc [ Avstand_m ]
 2: 2.47     F
 3: 11       Z Loc [ Snodjup_m ]

*Table 3 Subroutines

End Program

1      [ T1_bur__C ]  RW--   2       1      Start ------ ---
2      [ T2_skyd_C ]  RW--   14      1      ----- ------ End
3      [ T3_Rot__C ]  RW--   2       1      Start ------ ---
4      [ rH_Rot___ ]  RW--   2       1      ----- ------ End
5      [ Vhast_m_s ]  RW--   3       1      ----- ------ ---
6      [ Vrikt____ ]  RW--   4       2      ----- ------ ---
7      [ Sol__W_m_ ]  RW--   2       1      ----- ------ ---
8      [ Nederb_mm ]  ----   0       0      ----- ------ ---
9      [ Logtemp_C ]  -W--   0       1      ----- ------ ---
10     [ Batteri_V ]  RW--   2       1      ----- ------ ---
11     [ Snodjup_m ]  RW--   4       2      ----- ------ ---
12     [ _________ ]  ----   0       0      ----- ------ ---
13     [ _________ ]  ----   0       0      ----- ------ ---
14     [ _________ ]  ----   0       0      ----- ------ ---
15     [ _________ ]  ----   0       0      ----- ------ ---
16     [ _________ ]  ----   0       0      ----- ------ ---
17     [ _________ ]  ----   0       0      ----- ------ ---
18     [ _________ ]  ----   0       0      ----- ------ ---
19     [ _________ ]  ----   0       0      ----- ------ ---
20     [ _________ ]  ----   0       0      ----- ------ ---
21     [ Rs_Ro_T1  ]  RW--   1       1      ----- ------ ---
22     [ Rs_Ro_T2  ]  RW--   1       1      ----- ------ ---
23     [ Avstand_m ]  RW--   4       4      ----- ------ ---
24     [ T_SR50__K ]  RW--   2       2      ----- ------ ---
25     [ Ref_Temp_ ]  RW--   2       2      ----- ------ ---
26     [ Mult_     ]  RW--   4       4      ----- ------ ---
27     [ _________ ]  ----   0       0      ----- ------ ---
28     [ _________ ]  ----   0       0      ----- ------ ---
```

5.2 Program valid after 17 January

```
;{CR10}
*Table 1 Program
  01: 10.0000   Execution Interval (seconds)

1:  Batt Voltage (P10)
 1: 10       Loc [ Batteri_V ]

2:  If (X<=>F) (P89)
 1: 10       X Loc [ Batteri_V ]
 2: 4        <
 3: 9.7      F
 4: 0        Go to end of Program Table

3:  3W Half Bridge (P7)
 1: 1        Reps
 2: 33       25 mV 50 Hz Rejection Range
 3: 1        SE Channel
 4: 1        Excite all reps w/Exchan 1
 5: 2100     mV Excitation
 6: 21       Loc [ Rs_Ro_T1  ]
 7: 100      Mult
 8: 0.0000   Offset

4:  3W Half Bridge (P7)
 1: 1        Reps
 2: 33       25 mV 50 Hz Rejection Range
 3: 3        SE Channel
 4: 2        Excite all reps w/Exchan 2
 5: 2100     mV Excitation
 6: 22       Loc [ Rs_Ro_T2  ]
 7: 100.00   Mult
 8: 0.0000   Offset

5:  Temperature RTD (P16)
 1: 2        Reps
 2: 21       R/R0 Loc [ Rs_Ro_T1  ]
 3: 1        Loc [ T1_bur__C ]
 4: 1        Mult
 5: 0.0000   Offset

6:  Do (P86)
 1: 41       Set Port 1 High

7:  Volt (Diff) (P2)
 1: 2        Reps
 2: 35       2500 mV 50 Hz Rejection Range
 3: 3        DIFF Channel
 4: 3        Loc [ T3_Rot__C ]
 5: 0.1      Mult
 6: 0.0000   Offset

8:  Pulse (P3)
 1: 1        Reps
 2: 1        Pulse Input Channel
 3: 21       Low Level AC, Output Hz
 4: 5        Loc [ Vhast_m_s ]
 5: 0.098    Mult
```

```
 6: 0        Offset

9:  Excite-Delay (SE) (P4)
 1: 1        Reps
 2: 5        2500 mV Slow Range
 3: 9        SE Channel
 4: 3        Excite all reps w/Exchan 3
 5: 2        Delay (0.01 sec units)
 6: 2500     mV Excitation
 7: 6        Loc [ Vrikt____ ]
 8: 0.142    Mult
 9: -135     Offset

10:  If (X<=>F) (P89)
 1: 6        X Loc [ Vrikt____ ]
 2: 4        <
 3: 0        F
 4: 30       Then Do

11:  Z=X+F (P34)
 1: 6        X Loc [ Vrikt____ ]
 2: 360      F
 3: 6        Z Loc [ Vrikt____ ]

12:  End (P95)

13:  Volt (SE) (P1)
 1: 1        Reps
 2: 33       25 mV 50 Hz Rejection Range
 3: 10       SE Channel
 4: 7        Loc [ Sol__W_m_ ]
 5: 116.55   Mult
 6: 0.0000   Offset

14:  Internal Temperature (P17)
 1: 9        Loc [ Logtemp_C ]

15:  Do (P86)
 1: 42       Set Port 2 High

16:  Excitation with Delay (P22)
 1: 1        Ex Channel
 2: 1        Delay W/Ex (0.01 sec units)
 3: 0        Delay After Ex (0.01 sec units)
 4: 2        mV Excitation

17:  Do (P86)
 1: 52       Set Port 2 Low

18:  Pulse (P3)
 1: 1        Reps
 2: 2        Pulse Input Channel
 3: 0        High Frequency, All Counts
 4: 23       Loc [ Avstand_m ]
 5: -.0025   Mult
 6: 0.0000   Offset

19:  Z=X+F (P34)
```

```
 1: 2        X Loc [ T2_skyd_C ]
 2: 273.15   F
 3: 24       Z Loc [ T_SR50__K ]

20:  Z=F x 10^n (P30)
 1: 273.15   F
 2: 0        n, Exponent of 10
 3: 25       Z Loc [ Ref_Temp_ ]

21:  Z=X/Y (P38)
 1: 24       X Loc [ T_SR50__K ]
 2: 25       Y Loc [ Ref_Temp_ ]
 3: 26       Z Loc [ Mult_     ]

22:  Z=SQRT(X) (P39)
 1: 26       X Loc [ Mult_     ]
 2: 26       Z Loc [ Mult_     ]

23:  Z=X*Y (P36)
 1: 23       X Loc [ Avstand_m ]
 2: 26       Y Loc [ Mult_     ]
 3: 23       Z Loc [ Avstand_m ]

24:  Z=X+F (P34)
 1: 23       X Loc [ Avstand_m ]
 2: 2.45     F
 3: 11       Z Loc [ Snodjup_m ]

25:  If time is (P92)
 1: 0        Minutes (Seconds --) into a
 2: 60       Interval (same units as above)
 3: 10       Set Output Flag High

26:  Set Active Storage Area (P80)
 1: 1        Final Storage Area 1
 2: 101      Array ID

27:  Real Time (P77)
 1: 1220     Year,Day,Hour/Minute (midnight = 2400)

28:  Average (P71)
 1: 4        Reps
 2: 1        Loc [ T1_bur__C ]

29:  Wind Vector (P69)
 1: 1        Reps
 2: 1        Samples per Sub-Interval
 3: 0        S, é1, & å(é1) Polar
 4: 5        Wind Speed/East Loc [ Vhast_m_s ]
 5: 6        Wind Direction/North Loc [ Vrikt____ ]

30:  Average (P71)
 1: 1        Reps
 2: 7        Loc [ Sol__W_m_ ]

31:  Average (P71)
 1: 1        Reps
 2: 11       Loc [ Snodjup_m ]
```

```
32:  Sample (P70)
 1: 1        Reps
 2: 11       Loc [ Snodjup_m ]

33:  Serial Out (P96)
 1: 71       Storage Module

34:  If time is (P92)
 1: 0        Minutes (Seconds --) into a
 2: 1440     Interval (same units as above)
 3: 10       Set Output Flag High

35:  Set Active Storage Area (P80)
 1: 1        Final Storage Area 1
 2: 124      Array ID

36:  Real Time (P77)
 1: 1220     Year,Day,Hour/Minute (midnight = 2400)

37:  Average (P71)
 1: 4        Reps
 2: 1        Loc [ T1_bur__C ]

38:  Maximum (P73)
 1: 1        Reps
 2: 10       Value with Hr-Min
 3: 2        Loc [ T2_skyd_C ]

39:  Minimum (P74)
 1: 1        Reps
 2: 10       Value with Hr-Min
 3: 2        Loc [ T2_skyd_C ]

40:  Maximum (P73)
 1: 1        Reps
 2: 10       Value with Hr-Min
 3: 5        Loc [ Vhast_m_s ]

41:  Wind Vector (P69)
 1: 1        Reps
 2: 1        Samples per Sub-Interval
 3: 1        S, é1 Polar
 4: 5        Wind Speed/East Loc [ Vhast_m_s ]
 5: 6        Wind Direction/North Loc [ Vrikt____ ]

42:  Average (P71)
 1: 1        Reps
 2: 7        Loc [ Sol__W_m_ ]

43:  Average (P71)
 1: 1        Reps
 2: 11       Loc [ Snodjup_m ]

44:  Sample (P70)
 1: 1        Reps
 2: 11       Loc [ Snodjup_m ]
```

```
45:  Sample (P70)
 1: 1        Reps
 2: 10       Loc [ Batteri_V ]

46:  Serial Out (P96)
 1: 71       Storage Module

47:  If time is (P92)
 1: 60       Minutes (Seconds --) into a
 2: 1440     Interval (same units as above)
 3: 10       Set Output Flag High

48:  Set Active Storage Area (P80)
 1: 1        Final Storage Area 1
 2: 103      Array ID

49:  Real Time (P77)
 1: 1220     Year,Day,Hour/Minute (midnight = 2400)

50:  Sample (P70)
 1: 1        Reps
 2: 2        Loc [ T2_skyd_C ]

51:  If time is (P92)
 1: 240      Minutes (Seconds --) into a
 2: 1440     Interval (same units as above)
 3: 10       Set Output Flag High

52:  Set Active Storage Area (P80)
 1: 1        Final Storage Area 1
 2: 103      Array ID

53:  Real Time (P77)
 1: 1220     Year,Day,Hour/Minute (midnight = 2400)

54:  Sample (P70)
 1: 1        Reps
 2: 2        Loc [ T2_skyd_C ]

55:  If time is (P92)
 1: 420      Minutes (Seconds --) into a
 2: 1440     Interval (same units as above)
 3: 10       Set Output Flag High

56:  Set Active Storage Area (P80)
 1: 1        Final Storage Area 1
 2: 103      Array ID

57:  Real Time (P77)
 1: 1220     Year,Day,Hour/Minute (midnight = 2400)

58:  Sample (P70)
 1: 1        Reps
 2: 2        Loc [ T2_skyd_C ]

59:  If time is (P92)
 1: 600      Minutes (Seconds --) into a
 2: 1440     Interval (same units as above)
```

```
 3: 10       Set Output Flag High

60:  Set Active Storage Area (P80)
 1: 1        Final Storage Area 1
 2: 103      Array ID

61:  Real Time (P77)
 1: 1220     Year,Day,Hour/Minute (midnight = 2400)

62:  Sample (P70)
 1: 1        Reps
 2: 2        Loc [ T2_skyd_C ]

63:  If time is (P92)
 1: 780      Minutes (Seconds --) into a
 2: 1440     Interval (same units as above)
 3: 10       Set Output Flag High

64:  Set Active Storage Area (P80)
 1: 1        Final Storage Area 1
 2: 103      Array ID

65:  Real Time (P77)
 1: 1220     Year,Day,Hour/Minute (midnight = 2400)

66:  Sample (P70)
 1: 1        Reps
 2: 2        Loc [ T2_skyd_C ]

67:  If time is (P92)
 1: 960      Minutes (Seconds --) into a
 2: 1440     Interval (same units as above)
 3: 10       Set Output Flag High

68:  Set Active Storage Area (P80)
 1: 1        Final Storage Area 1
 2: 103      Array ID

69:  Real Time (P77)
 1: 1220     Year,Day,Hour/Minute (midnight = 2400)

70:  Sample (P70)
 1: 1        Reps
 2: 2        Loc [ T2_skyd_C ]

71:  If time is (P92)
 1: 1140     Minutes (Seconds --) into a
 2: 1440     Interval (same units as above)
 3: 10       Set Output Flag High

72:  Set Active Storage Area (P80)
 1: 1        Final Storage Area 1
 2: 103      Array ID

73:  Real Time (P77)
 1: 1220     Year,Day,Hour/Minute (midnight = 2400)

74:  Sample (P70)
```

```
 1: 1        Reps
 2: 2        Loc [ T2_skyd_C ]

75:  If time is (P92)
 1: 1320     Minutes (Seconds --) into a
 2: 1440     Interval (same units as above)
 3: 10       Set Output Flag High

76:  Set Active Storage Area (P80)
 1: 1        Final Storage Area 1
 2: 103      Array ID

77:  Real Time (P77)
 1: 1220     Year,Day,Hour/Minute (midnight = 2400)

78:  Sample (P70)
 1: 1        Reps
 2: 2        Loc [ T2_skyd_C ]

*Table 2 Program
  01: 0.0000    Execution Interval (seconds)

*Table 3 Subroutines

End Program

1      [ T1_bur__C ]  RW--   2       1      Start ------ ---
2      [ T2_skyd_C ]  RW--   13      1      ----- ------ End
3      [ T3_Rot__C ]  RW--   2       1      Start ------ ---
4      [ rH_Rot___ ]  RW--   2       1      ----- ------ End
5      [ Vhast_m_s ]  RW--   3       1      ----- ------ ---
6      [ Vrikt____ ]  RW--   4       2      ----- ------ ---
7      [ Sol__W_m_ ]  RW--   2       1      ----- ------ ---
8      [ Nederb_mm ]  ----   0       0      ----- ------ ---
9      [ Logtemp_C ]  -W--   0       1      ----- ------ ---
10     [ Batteri_V ]  RW--   2       1      ----- ------ ---
11     [ Snodjup_m ]  RW--   4       1      ----- ------ ---
12     [ _________ ]  ----   0       0      ----- ------ ---
13     [ _________ ]  ----   0       0      ----- ------ ---
14     [ _________ ]  ----   0       0      ----- ------ ---
15     [ _________ ]  ----   0       0      ----- ------ ---
16     [ _________ ]  ----   0       0      ----- ------ ---
17     [ _________ ]  ----   0       0      ----- ------ ---
18     [ _________ ]  ----   0       0      ----- ------ ---
19     [ _________ ]  ----   0       0      ----- ------ ---
20     [ _________ ]  ----   0       0      ----- ------ ---
21     [ Rs_Ro_T1  ]  RW--   1       1      ----- ------ ---
22     [ Rs_Ro_T2  ]  RW--   1       1      ----- ------ ---
23     [ Avstand_m ]  RW--   2       2      ----- ------ ---
24     [ T_SR50__K ]  RW--   1       1      ----- ------ ---
25     [ Ref_Temp_ ]  RW--   1       1      ----- ------ ---
26     [ Mult_     ]  RW--   2       2      ----- ------ ---
27     [ _________ ]  ----   0       0      ----- ------ ---
28     [ _________ ]  ----   0       0      ----- ------ ---
```