

Software A6C 114 004 for Compact 5 CNC

The new Software A6C 114 004 was developed for the Compact 5 CNC. It has a number of new features as compared with the old software A6C 114 003. The chart on the following pages give you an overview.

Short Summary of Extensions and New Features

General:

- * Permanent read-out in manual mode.
- * Increased block numbers: N00 to N209
- * Additional addresses H,I,K,L,T,M;

Extensions of G-Codes:

- * Circle programming G02,G03:
all partial arcs can be programmed in steps of 0,01 mm. Programming via center point coordinates I,K; sizes of arcs up to parameter values X⁺59,99 mm, Z⁺327,60 mm, I 59,99 mm, K 327,60 mm.
- * Dwell can be programmed
- * Subroutines - fivefold, jump instructions.
- * New canned cycles with automatic division of cut:
G78 Threading
G84 Longitudinal turning
G86 Grooving
G88 Facing
- * Drilling cycles - new

Introduction of M-Codes

Compare Survey M-Codes

- * With machines delivered ex-works, M03 and M05 can be activated via program. The machines delivered ex-works are equipped with a main switch (0-HAND-CNC). With machines already in use the functions M03 and M05 cannot be activated.
- * Using M98 an automatic compensation of play can be programmed for X- and Z-slides.

Extension to the Programm Sequence:

- * Single block operation
- * Test-run: no slide movement is executed, the program is checked for syntax mistakes.
- * Enlarged DNC-interface

New Software Compact 5 CNC A6C 114 004

Machines with CPU A6C 114 004 ex works

With these machines you will find activated

M03 (main spindle ON)

M05 (main spindle OFF)

M30 (end of program, main spindle OFF)

These machines have a different main switch built in;

it shows - Zero position

- Manual mode

- CNC-mode

Re-mounted Machines

M03 }
M05 } not activated

The main spindle has to be switched on by hand.

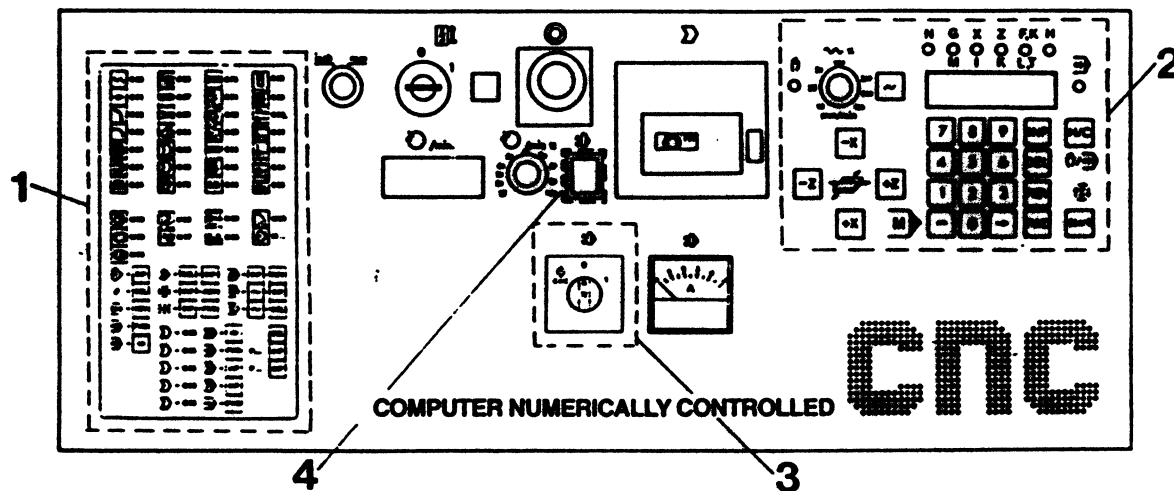
M30: M30 means end of program but not main spindle OFF.

Re-mounting of Compact 5 CNC with
New Software A6C 114 004

1. Stick on the two front charts:
 - * Chart showing extended G- and M-codes.
 - * Chart showing new addresses and feeds.
2. Build-in CPU- A6C 114004

Note:

M03 and M05 cannot be activated with re-mounted machines. M03 and M05 is only activated with machines showing control serial number 5350 onwards.

Modification of Front Panel

1. Front chart 1
2. Front chart 2 showing new addresses
H-symbol and feeds.
3. Main spindle switch (CNC-0-1)
Installed with machines with
control serial number 5350
and higher.
4. Switch for the main spindle.
Not installed with machines with
control serial number 5350 or
higher any more.

Old Programs, New Software

You can read in or put in old programs
(CPU A6C 114 001, A6C 114 003).

However before you start, you have to carry out
modifications and extensions in these programs.

The Following modifications have to be done

G00: If you traverse in the program only in
X-axis, you have to add Z = 0.

G02/G03: Include Z-value of the target point of
arc.

Example:

Incremental programming

N.../G03/X500/F...

Software A6C 114 004

N.../G03/X500/Z-500/F...

G84/G78: Include parameter H = 0

G20 → M00 G20 has to be cancelled
M00 has to be put in

G22 → M30 cancel G22 -> put in M30

G23 X ≠ 0 → M08

X ≠ 0 → M09 (only if Z ≠ 0 before)

Z ≠ 0 → M22

Z ≠ 0 → M23 (only if Z ≠ 0 before)

G26 --> M06 Cancel G26, put in M06

G-Codes - Extensions

A6C 114 003		A6C 114 004	
G00	Rapid traverse		
G01	Linear interpolation		
G02	Circular interpolation Clockwise		<u>New:</u> - Programming with center point coordinates DIN 66025 - Each desired circle arc possible; no limitation in angles.
G03	Circular interpolation Counter clockwise		
G04	Dwell		<u>New:</u> Input of dwell period.
G20	Intermediate Stop	M00	(G20 replaced)
G21	Empty Line		
G22	End of program	M30	(G22 replaced)
G24	Radius programming		
		G25	Sub-routine call-up
G26	Tool correction and tool call-up	M06	(G26 replaced)
		G27	Jump instruction
G33	Threading with constant pitch		<u>New:</u> Input of thread pitch under address K.
G64	Feed motors currentless		
G65	Cassette operation		
G66	RS 232 operation		
		G73	Chip breakage cycle
G78	Threading cycle		<u>New:</u> Automatic division of cut.
		G81	Drilling cycle
		G82	Drilling cycle with dwell
		G83	Drilling cycle, deep hole with withdrawal

A6C 114 003		A6C 114 004	
G84	Longitudinal turning	→	<u>New:</u> Automatic division of cut (parameter H)
		G85	Reaming cycle
		G86	Grooving with division of cut (parameter H)
		G88	Facing with division of cut (parameter H)
		G89	Reaming and drilling with dwell
G90	Absolute value programming	→	
G91	Incremental value programming	→	
G92	Set register (zero point offset)	→	
G94	Feed in mm/min	→	
G95	Feed in mm/rev.	→	

M-Codes

CPU as per No. A6C 114 003	CPU as per No. A6C 114 004	
G20 —————→	M00	Programmed stop
	M03	Main spindle ON, right hand direction run
	M05	Main Spindle OFF
G26 —————→	M06	Tool length compensation
	M08	Switch exit X62 PIN 15 HIGH
	M09	Switch exit X62 PIN 15 HIGH
	M17	Return command to the main program
	M22	Switch exit X62 PIN 18 LOW
	M23	Switch exit X22 PIN 18 LOW
	M26	Switch exit X62 PIN 20
G22 —————→	M30	End of Program
	M98	Automatic compensation of play
	M99	Circle parameter

Addresses

(Extension SW-A6C 114 004)

CPU as per NO: A6C 114 003		CPU as per No: A6C 114 004	
N	Block number	→	<u>NEW:</u> N00 to N209
G	Traverse function		
M	Miscellaneous function		
X	Traverse coordinates	→	
Z			
F	Feed	→	
		I	Center point coordinates
		K	
		X	Dwell
		L	Jump address
T	Tool address	→	
		H	Parameter division of cut
		H	Parameter impulse edit
		K	Thread pitch

Format A6C 114 004

G-Codes

N	G (M)	X (I)	Z (K)	F (T)(L)(K)	H	Remarks
...	00	±.....	±.....	.....	.....
...	01	±.....	±.....	...	.....
...	02	±.....	±.....	...	.....
...	03	±.....	±.....	...	.....
...	04	.....	.....	.....	.....
...	21	.....	.....	.....	.....
...	24	.....	.....	.....	.....
...	25	.....	.....	L...	.....
...	27	.....	.....	L...	.....
...	33	.....	±.....	K...	.....
...	64	.....	.....	.....	.....
...	65	.....	.....	.....	.....
...	66	.....	.....	.....	.....
...	73	.....	±.....	...	.....
...	78	±.....	±.....	K...	...	
...	81	.....	±.....	...	.....
...	82	.....	±.....	...	.....
...	83	.....	±.....	...	.....
...	84	±.....	±.....	...	...
...	85	.....	±.....	...	.....
...	86	±.....	±.....	...	...
...	88	±.....	±.....	...	...
...	89	.....	±.....	...	.....
...	90	.....	.....	.....	.....
...	91	.....	.....	.....	.....
...	92	±.....	±.....	.....	.....
...	94	.....	.....	.....	.....
...	95	.....	.....	.....	.....

M-Codes

..	M 00	.....	.....	.....	.....
..	M 03	.....	.....	.....	.....
..	M 05	.....	.....	.....	.....
..	M 06	±.....	±.....	T...	.....
..	M 08	.....	.....	.....	.....
..	M 09	.....	.....	.....	.....
..	M 17	.....	.....	.....	.....
..	M 22	.....	.....	.....	.....
..	M 23	.....	.....	.....	.....
..	M 26	.....	.....	.....	...
..	M 30	.....	.....	.....	.....
..	M 98	...	...	.....	.....
..	M 99	I....	K .....	.....	.....

Summary of Max. ValuesInput size

(SW-A6C 114 004)

Address	Metric		Inch	
	Value	Dimension	Value	Dimension
N Block number	00-209	1	00-209	1
G Traverse function (G-Codes)	00-95	1	00-95	1
M Miscellaneous function (M-Codes)	00-99	1	00-99	1
X Coordinate CNC-input	0- \pm 5999	$\frac{1}{100}$ mm	0- \pm 1999	$\frac{1}{1000}$ "
Z Coordinate CNC-input	0- \pm 32760		0- \pm 12900	
X Coordinate hand input	0- \pm 89999		0- \pm 29999	
Z Coordinate hand input	0- \pm 89999		0- \pm 29999	
F Feed	2-499		2-199	
With G94		mm/min		$\frac{1}{10}$ "/min
With G95		$\frac{1}{1000}$ mm/U		$\frac{1}{10000}$ "/U
I Circle point coordinate in X	0-5999	$\frac{1}{100}$ mm	0-1999	$\frac{1}{1000}$ "
K Circle point coordinate in Z	0-32760			
X Dwell (time)	0- \pm 5999	$\frac{1}{100}$ sec	0- \pm 1999	$\frac{1}{100}$ sec
L Jump address	0-221	1	0-221	1
T Tool address	0-499		0-199	
H Parameter division of cut	0-999	$\frac{1}{100}$ mm	0-999	$\frac{1}{1000}$ "
H Parameter width of turning tool (G86)	10-999		10-999	
H Parameter impulse edit	0-999		0-999	
K Thread pitch	2-499		2-199	

Max. Main Spindle R.P.M.
when Threading
(SW-A6C 114 004)

Thread pitch		max. r.p.m.
metric [mm]	inch ["]	
0,02 - 0,5	0,002 - 0,02	950
0,5 - 1	0,02 - 0,04	500
1 - 1,5	0,04 - 0,06	320
1,5 - 2	0,06 - 0,08	250
2 - 3	0,08 - 0,12	170
3 - 4	0,12 - 0,16	120
4 - 4,99	0,16 - 0,199	100

Alarm Signs

(SW-A6C 114 004)

If you want to put in and register data the computer does not know, the alarm sign will be indicated. The read-out shows AL and the respective alarm number.

On the monitor screen the alarm number is shown together with an explanatory text.

Alarm Signs - Survey

A00 Wrong G- or M-Code:

Example of an incorrect input: G61

A01 Wrong Circle Interpolation:

With input of wrong circle points (Arc, circle target points resp. center point coordinates) alarm 01 is given.

The computer checks whether an arc with the given values is possible before it works off the arc.

A02 X-Value too Large

For max. values compare chart max.values!

A03 Wrong F-Value

Compare chart max. values!

A04 Z-Value too large

For max. values compare chart max.values!

A05 No M30 Programmed

If you forget to put in M30 at the end of the program and you press the start key resp. want to carry out a test run, alarm 05 will be shown.

A06 Main Spindle R.P.M. too High when Threading

This alarm shows only during program execution and not at program input (G33 or G78).

Measures:

- reduce r.p.m.
- press keys INP + REV;
the alarm disappears, program execution is automatically continued if the respective r.p.m. is given. Max. r.p.m. for threading compare chart.

A07 Not occupied

ALARM SIGNS IN CASSETTE OPERATION

A08 Tape end with SAVE

A09 Program not found

A10 Writing protection active

A11 Running Fault

For detailed explanations of alarms A08 - A12 compare cassette operation.

A13 Switching from mm to Inch with Full Register

If you read in a metric program, however the selector switch is set at Inch, this alarm will be given.

A15 Wrong H-Value

Possible value compare chart max.values!

A16 Not used

A17 Wrong sub-routine:

If a sub-routine is more than five-fold.

Note:

- Alarm 13 can only be cancelled by turning the selector switch metric/ inch.
- Alarm A06 can only be cancelled if the main spindle r.p.m. is reduced.
- For Alarm Signs in Cassette-Operation Mode look for the chapter Cassette Operation.

The alarms appear on the monitor with following texts:

A00	- Wrong M-/G-Instruction
A01	- Wrong Radius /M99
A02	- Wrong X-Value
A03	- Wrong F-Value
A04	- Wrong Z-Value
A05	- No M30 Programmed
A06	- Spindle Speed too High
A08	- End of the Tape Operation
A09	- Program not Found
A10	- Writing Protection active
A11	- Loading Mistake
A12	- "CHECK" Mistake
A13	- Inch/mm - Change with Full Program Memory
A14	- Wrong H-Value
A15	- Wrong Subroutine

DNC-Interface**PIN - Coverage**

X62/PIN	1	A	Status hand
	2	E	Turret - hand operation
	3	E	Instruction G66 + INP
	4	-	-
	5	-	-
	6	E	Instruction G66 + FWD
	7	A	Status program running
	8	A	Status intermediate stop
	9	E	Instruction switch hand /CNC
	10	-	-
	11	-	-
	12	-	-
	13	-	-
	14	-	-
	15	A	Output set with M8, M9
	16	-	-
	17	E	Instruction start
	18	A	Output set with M22, M23
	19	A	Status main motor ON/OFF.
	20	A	Output impulse set with M26
	21	E	Instruction blockage-turret
	22	V	+10V not controlled
	23	V	} GND
	24	V	
	25	V	
	26	V	+5V controlled

E = Input
 A = Output
 V = Power